

No. X, on January 1st, 1862, 2s. 6d.

Published Quarterly. Free by Post.

Edmund M. Hadden

Annual Subscription 10s. payable in advance

Proctor.

Biological
& Medical
Serials

2s. 6d.

OCTOBER, 1861.

No. IX.

ARCHIVES

3 # 9
OF

MEDICINE:

A RECORD OF PRACTICAL OBSERVATIONS, AND ANATOMICAL AND
CHEMICAL RESEARCHES CONNECTED WITH THE INVESTIGATION
AND TREATMENT OF DISEASE.

STORAGE

EDITED BY

LIONEL S. BEALE, M.B., F.R.S.,

Illustrated with wood-cuts, lithographs, and coloured plates carefully copied from
Nature.



LONDON:

JOHN CHURCHILL, NEW BURLINGTON STREET.

MDCCCLXI.

PRINTED BY HARRISON AND SONS, ST. MARTIN'S LANE, W.C.

Now Ready.

Price 15s. each, Cloth 8vo.

With copious Index, Table of Contents, &c., Woodcuts, and Plates, many of which are coloured.

VOLS. I. & II.

OF THE

ARCHIVES

OF

MEDICINE,

WITH ORIGINAL PAPERS AND COMMUNICATIONS FROM THE
FOLLOWING CONTRIBUTORS.

Charles Allfrey.	P. Eade, M.D.	W. H. Michael, M.R.C.S.
Scott Alison, M.D.	Arthur Farre, M.D., F.R.S.	H. Munroe, M.D.
J. T. Arlidge, M.D.	G. D. Gibb, M.D.	Charles Murchison, M.D.
Milner Barry, M.D.	W. A. Guy, M.D., F.S.S.	S. Newham.
R. Barwell, F.R.C.S.	Robinson Hill, M.D.	John Ogle, M.D.
Lionel Beale, M.B., F.R.S.	J. W. Hulke, F.R.C.S.	William Ogle, M.D.
Warburton Begbie, M.D.	E. C. Hulme, F.R.C.S.	Charles Parsons, M.R.C.S.
S. D. Bird, M.R.C.S.	W. E. Image, F.R.C.S.	Edward Ray, F.R.C.S.
Moritz Von Bose, Ph. D.	Rev. G. S. B. Isbell.	Chas. Roberts, M.R.C.S.
W. Cayley, M.R.C.S.	George Johnson, M.D.	Russell Reynolds, M.D.
Robert Ceely, M.R.C.S.	Handfield Jones, M.D., F.R.S.	George Scott, M.D.
Gilbert Child, M.D.	G. Kennion, M.D.	A. E. Sansom, M.B.
Lockhart Clarke, F.R.C.S.	R. Lawson, Dir. Gen.	J. W. Suffolk.
George R. Cubitt, M.R.C.S.	Henry Lee, F.R.C.S.	Robert Taylor, F.R.C.S.
Edwin Day, M.R.C.S.	W. Marcet, M.D., F.R.S.	Robert B. Todd, M.D., F.R.S.
A. B. Duffin, M.D.	S. Martyn, M.D.	Charles Workman, M.R.C.S.

Subscribers' Names may be sent to the Editor.

Copies will be forwarded on the morning of publication, post free, to gentlemen who send their addresses, accompanied with a remittance for their subscription, to the Editor, King's College, London.

ARCHIVES OF M E D I C I N E.

V O L. I I I.

PART I.

CLINICAL OBSERVATIONS.

ON AN IMPORTANT CASE OF MUSCULAR ATROPHY,
ACCOMPANIED WITH DISEASE OF THE SPINAL CORD.

MICROSCOPIC EXAMINATION OF THE DISEASED STRUCTURE WITH
COMMENTS, BY J. LOCKHART CLARKE, F.R.S., London.

CLINICAL OBSERVATIONS, BY W. T. GAIRDNER, M.D. Physician to the
Royal Infirmary, Edinburgh.

A NARRATIVE OF THE HISTORY OF THE PATIENT, BY JOHN
ADAMSON, M.D. & OSWALD H. BELL, M.D., of St. Andrews.

With Notes by

W. W. GULL, M.D., Physician to, and Lecturer on Medicine at, Guy's Hospital,
&c., &c.; and G. E. DAY, M.D., Professor of Anatomy and Medicine in the
University of St. Andrews, &c., &c.

PLATE I.

CLINICAL OBSERVATIONS, BY DR. GAIRDNER.

AS the interest of the case recorded in this paper depends, to a very great extent, on particulars falling within the observation of Mr. J. Lockhart Clarke, to whom a portion of the nervous centres was transmitted, and who has, in the interest of science, kindly undertaken to publish the results of his observations, I think I shall best fulfil my part by simply prefixing a notice of the leading phenomena observed during life and after death; leaving the anatomical and physiological discussion of the facts in the hands of those more competent to do justice to them. And as the case was one of more than usual importance, it may be well to explain that my connection with it consists chiefly in having seen the patient at intervals, in consultation with

VOL. III.

B

Drs. Adamson and Bell, of St. Andrews, to whom I owe the concise narrative of the history introduced into the present record. At one time, indeed, the patient was under my care for a period of a good many weeks, during which he resided in Edinburgh; but from his frequent changes of residence, and consequently of medical superintendence, it is difficult or impossible to furnish a continuous narrative of the facts in detail; and hence the somewhat desultory form of this paper, which will however, I trust, be found to subserve, in some degree, the purposes of the physiologist and of the practical physician. The patient was seen, at different times, by the following physicians, among others: Dr. Day, of St. Andrews, who took a very constant interest in his case from first to last; Drs. Christison, Simpson, Begbie, and myself, in Edinburgh; Dr. Andrew Anderson, in Glasgow; Drs. Todd, Burrows, Copland, and Gull, in London, and Dr. Robertson, of Brixton; at a later period by a considerable number of foreign physicians, and last of all, by Dr. Brown-Séquard, on his visit to Scotland in 1859. As several of these gentlemen were much interested in the case, I would suggest that a copy, in proof, of this record should be transmitted to each of them, in order that any supplementary facts may be duly embodied in the publication, either by communication with me, or by a separate statement transmitted to the Editor, who will, I trust, assume the responsibility of doing justice to these communications, in as far as consistent with the objects of his Journal.

The following is the narrative of Drs. Adamson and Bell, with some slight additions as to the treatment, derived from my personal knowledge.

“Dr. P.—, aged 65 years, small in stature, of sanguine temperament, florid complexion, and full habit, leading a temperate and sedentary life, and engaged in literary occupations, in the end of 1855 began to complain of neuralgic pains in the ball of the thumbs of both hands, which before long extended to the forearms and arms. After some months he was conscious of marked weakness in the hands, more especially in the right, soon followed by perceptible diminution of size in the muscles of the thumbs and index fingers, which also became bent inwards and towards the palms, as an habitual posture. In the summer of 1857, this habitual flexure of the thumbs occasioned manifest deformity of the hands, which themselves became flexed towards the wrists, with a constant tendency to assume the prone position. His difficulty in using the hands, especially the right, was most apparent when in the act of taking food, or

when raising a glass to his mouth. When extending the fore-arms also, the deformity was very visible, as the flexion and pronation of the hands were then fully seen. The position of the hands and fingers, at once conveyed to medical observers the impression of the "drop't wrist," resulting in cases of paralysis from "lead poisoning;" so much so, indeed, as to have led to a careful examination on this point, but without any trace of such a cause for his symptoms being discovered. All this time, while his general health was good, and his body corpulent, he made great complaint of severe neuralgic pains shooting down his arms into the hands and thumbs, and also of weakness of the back; and considering himself a great invalid, he consulted many doctors, and went to various watering places and spas in succession, in Scotland, England, and Germany. Nothing abnormal could be detected in the organs of the chest or abdomen. The kidneys and bowels acted regularly, and apparently naturally—he had no tenderness of the spine, no headaches, and his mind, when not turned upon his own condition, was clear and rational. The only occasion on which anything like head-symptoms occurred, was in the end of 1856, at which time, on opening his class in the University, as was usual, with prayer, he became so confused while repeating the "Lord's Prayer," as to have to stop entirely, and appeared as if about to take some sort of fit. This passed off without bad effect or any recurrence.

"The further history of Dr. P——'s case, up to the time of his death (in January, 1861), which was preceded for a few days, and possibly actually caused, by an attack of "acute laryngitis," is nothing more than a detail of the gradual increase in the intensity of the symptoms already noted, and the extension of the pains to the lower limbs and feet, where the sensation of "intense heat and burning" was constantly complained of, aggravated by the act of walking. The pains were also referred to the trunk and breast, while the acts of mastication and deglutition, and even the process of shaving, were complained of as agonizing. These did not, however, interfere with his partaking of hearty meals. Within the last year or two there was a gradual falling-off in strength and general health, with an equally gradual and regular increase in the rapidity of the pulse, which from 65 (his natural pulse at the beginning of his illness), had risen to 100 and upwards towards the end of his last year. The respiration was not proportionally affected.

"His own description of the pain he endured in his arms and hands, as well as throughout the body, became in the same degree more and more intense, until language failed him to

express the "torture and agony" he was enduring, and his whole mind seemed engaged in the realization of his sufferings. He could not be prevailed upon to take either walking or carriage exercise, and for many months before his death was unable to feed himself, or use his hands in any serviceable way.

"His body, at the post-mortem examination, was found loaded with fat. There was a marked decrease in the size of his arms and forearms, and the muscles of the balls of the thumbs and index fingers were much atrophied, and of a pale fawn-colour. The position of the thumbs, and the general flexure of the fingers and wrist, so marked during life, continued in the same degree after death, and is, in some degree represented in a drawing.



Left arm and hand in the case of Dr. P., sketched from the dead body. The body was lying on its face, both forearms in the position of extreme pronation, which had become habitual; the hand and fingers inclined towards the ulnar side, and the fingers were always more or less bent towards the palm. The ball of the thumb was much atrophied, the flexor muscles of thumb pale and deficient in striated fibre, but not to any great extent in a state of fatty degeneration. The muscles of the forearm generally were small and rather flaccid, but their colour was well preserved. There was no very apparent difference between the flexors and extensors.

"As respects treatment, it may be mentioned that he made a long continued trial of the following remedies, viz.—Iodide of potassium with sarsaparilla, strychnine, quinine, valerianate of zinc, phosphate of zinc, arsenic, tinctures of lobelia and lupulus, of cantharides, ergot of rye, *actea racemosa*, with various mineral acids. Throughout the progress of the disease; he employed occasional, and for the last two years regular, laxatives of colocynth and henbane, varied by the more active preparations of scammony and calomel. He had sedatives in every variety of form, externally and internally, and for the last three years, took Battley's sedative solution regularly every night, consuming about $\frac{3}{4}$ xxx each year, besides trying chlorodyne, chloric ether, conium, henbane, lupulin, &c., &c. He tried galvanism and regular friction, or shampooing of the limbs, wet bandages, &c., &c. Subcutaneous injection of mor-

phia was repeatedly tried when pain was concentrated in any individual spot.

"Among other systems of treatment, he made a lengthened trial of the waters at Aix-la-Chapelle, and visited also several other German baths, including a water-cure establishment; he also placed himself, for a time, under a quack-doctor, whose grand specific was systematic friction and kneading of the spine. These plans of treatment he discontinued only on being thoroughly convinced that they did him no good.

"Counter irritation along the spine was also had recourse to, but each and all without the experience of any, even temporary, relief. The diet was always generous, and with a liberal allowance of stimulants."

Thus far Dr. Adamson and Bell's narrative. When I first saw Dr. P. in the end of October, 1856, the leading symptom was, as it continued to be to the last, the loss of power and of volume in the muscles of the hand and forearm; particularly in those of the ball of the thumb, which were as completely atrophied as in a pretty aggravated case of lead palsy; while, even at this time, the relaxation of the extensors of the forearm, and the peculiar attitude of the upper extremities, recalled that form of disease so strongly, as to suggest to all who had seen the patient medically the necessity of careful inquiries as to the possibility of metallic poisoning of any kind. There was, however, an entire absence of cachectic appearance; there never had been anything resembling colic, and the bowels, though sometimes requiring medicine, could not be said to be constipated to any great degree; the blue line on the gums could not be discovered; and the facts as regards residence, occupation, water-supply, &c., were such as to afford, in the opinion of his local medical advisers, no reasonable ground for suspicion of the presence in the system of lead, or of any other known poison. I believe, however, that the patient, at various periods before and after consulting me took iodide of potassium, with a view to the bare possibility of the existence of lead poisoning: and, on the advice of two very distinguished physicians who adopted that theory of his case, he afterwards went to Aix-la-Chapelle to drink the waters for a time, with no more benefit than from other modes of treatment. I lay no stress upon the fact that "a trace" of lead was alleged to have been found in the urine by an analytical chemist in London. If present at all, it must have been due to some accidental and temporary cause in London; for immediately on the return of Dr. P. to Scotland, the analysis was

repeated with the greatest care by the late Professor George Wilson (at the instance of Dr. Day), and without any result, not even the most infinitesimal "trace" of lead being obtained from a large quantity of the urine.

Setting aside the theory of lead poisoning, the disease which appeared most closely to resemble that of Dr. P. at the time I first saw him, was the form of palsy described by Cruveilhier, Aran, and others, as the "*Paralysie musculaire atrophique*," or "*Atrophie musculaire progressive*." The chief points of resemblance were the wasting of particular groups of muscles; the symmetrical character of the disease; the preservation of the tactile sensibility, whether tested by the sensations of the patient, or by the method of Weber; and the absence of any central paralysis, or, indeed, of any except the most vague indications of disorder (even functional) of the brain and spinal cord. I remember distinctly, indeed, that the patient at this time complained of some degree of difficulty in walking, as well as of pain in the lower limbs (which had been a very early symptom); and also of a liability to trip in going down a stair (it must be mentioned that there was ice on the ground at the time); but after careful examination, I found it impossible to determine how far these symptoms were real and positive, and how far they depended upon the intense exaggeration and nervous irritability which appeared to pervade his entire narrative of his own sufferings. To the last, although the patient became very inactive and unwilling to walk, there was no distinct indication of paraplegia, either in his gait, or in his power of retaining his balance in the upright posture.

Considered as an instance of Cruveilhier's paralysis, Dr. P.'s case always appeared to me to present an unusual amount, and a very remarkable persistency, of *pain* as one of its phenomena. From the summary of cases of this disease, given in the late excellent work of Dr. Roberts* of Manchester, it will be seen that pain, in greater or less degree, was present in about one-half of the cases recorded; but in most of them it was transient, extending over a few weeks, or, at most, months, usually at the beginning of the disease. It is certainly very remarkable, that in no one of Cruveilhier's four cases, though so elaborately recorded and observed over a long period, was there any pain; and the same entire absence of pain characterises all

* An Essay on Wasting Palsy. (Cruveilhier's Atrophy.) By William Roberts, B.A., M.D., Lond., &c. London, 1858. A remarkably complete and valuable memoir, which was very carefully considered by me in connection with Dr. P.'s case, and enables me to express the opinions here maintained as having been duly weighed during the life of the patient.

the cases of Dr. Meryon, in the 35th vol. of the Medico-Chirurgical Transactions, and also those of M. Duchenne, recorded at length in his work on Localized Electricity. In several of Aran's cases, on the contrary, pain was observed to a greater or less extent, and, what is remarkable, quite as often in other parts of the body as in those immediately affected with muscular wasting. The disease, in fact, as described by Aran and others, would appear to have been in some instances founded on a more or less general neuralgic or rheumatic tendency.

In one of the cases recorded by Romberg, there were pains in the back of the neck and face, the muscular disease having first affected the tongue, and then advanced to the muscles of deglutition and respiration; in another, there was neuralgia of the *opposite* arm to the one affected with paralysis; and in the affected arm, pains preceding the paralysis by about a year. In one or two cases, the pains were chiefly in the lower limbs, and the paralysis in the upper. Besides these, cases have been recorded which were obviously complicated with cerebral disease. On the whole, it may reasonably be doubted whether Dr. P.'s case was really of the same pathological character as those recorded by Cruveilhier himself; but then it must also be admitted, that many cases referred by authors to the type of progressive muscular atrophy have equally little right to that designation, considered as indicating a specific form of disease. Without entering here upon a general discussion of this subject, I think we must, in the meantime, at least, hesitate to admit that a disease, which differs so much in particular cases, is fairly to be included under a single physiological form; especially when its pathology is as yet so entirely undetermined, that even in the opinion of the authorities to whom we chiefly owe its description, it is quite uncertain whether the muscles or the nerves are the starting-point of the affection. I rather incline to the view, that under the name of "*paralysie musculaire atrophique*," as under the English title of "*wasting palsy*," employed by Dr. Roberts, several distinct diseases have probably been confounded together; and to some of these the case of Dr. P. certainly presents many points of resemblance. It is to be observed, that neither the excessive sensitiveness to low temperatures, nor the muscular vibrations observed in many of M. Duchenne's cases and others, were present in Dr. P.'s. The sensibility of the affected muscles to the galvanic stimulus was decidedly and, I think, progressively impaired, but hardly at any time altogether lost.

The advance of the disease was attended, in the case of Dr. P., by an almost childish degree of helplessness, and a truly

pitiable state of mental irritability and hypochondriac depression. Day after day he would describe to every visitor, in succession, and always in language of the most intense kind, the sufferings he was enduring; over and over again I have heard him express his conviction that it was impossible for him to survive many more days of pain, while all the time his complexion, his pulse, his respiration, and the general muscular development of an originally robust frame, continued to indicate no serious diminution in the activity of the functions, with the exception of those mentioned as directly involved in the disease. Even up to a late period his appetite continued good, and his colour florid, while the tendency to take on fat was never checked, and may, indeed, have been increased by his extremely inactive habits. It was for a long time with the utmost difficulty (and latterly not at all) that he could be got to take exercise, whether on foot or in a carriage. The pain was not at all distinctly localized, nor accompanied by tenderness or pressure; and although he always spoke as if it was much aggravated by continued movement, whether active or passive, he never appeared to suffer acutely in any particular point, or under any particular kind of movement more than another. He always insisted on retiring very early to bed, giving as a reason, that his "torture" was a little less when in the recumbent position; and as he always rose late, it often happened that he would only be in his sitting-room for a few hours in the afternoon. To whatever extent he was occupied, it was with books; but at times his own sufferings monopolized his attention completely, and he declared that he could not read even a newspaper. Even at these times, however, it was not difficult to engage him in conversation; and when under excitement, he would display considerable activity, both of mind and body. His craving for sympathy was excessive, and it was difficult to resist a feeling of something ludicrous in his oft-repeated declarations, that "no mortal could conceive" how much he suffered; that every day he was "a thousand times worse" than before; and that he was sure "it must very soon come to an end now," as "no man could bear this" for many days longer, and live. I am sure I have heard all these expressions, or others like them, used over and over again up to hundreds of times, in the course of a few weeks during which he was under my observation in Edinburgh.

With all this loss of self-control and mental energy, there was no delirium, no disorder of the senses, no inconsequence of reasoning, no delusion (unless his pain was a delusion); his sight was good for his years; his hearing was unimpaired: his

articulation perfect; his memory seemed to be good; and, except that his constant preoccupation with his sufferings prevented the right use of his mental powers, the intellectual and moral faculties were wonderfully little affected by his disease. There was never any headache, dizziness, numbness, or impaired sensibility; no disorder of the special senses; never anything approaching to coma or convulsion (with a doubtful exception, mentioned above, in November, 1856); there was no paralysis of the articulation, or of the voice, or of respiration; and, in general, the voluntary movements, with the exception of those of the specially affected groups of muscles, as described by Drs. Bell and Adamson, were normal. The sphincters, indeed, seemed now and then to be not quite under control, for he sometimes (though not often, nor in the later periods of the disease,) passed his urine in bed; but he himself described this accident as owing entirely to his difficulty of getting out of bed in the dark, and not being able, accordingly, to get relief otherwise.*

From a very early period in the history of the case (certainly from the end of 1856), there was a very distinct difference in the size of the pupils; the right being constantly larger, by perhaps one-third, than the left. Neither pupil, however, could be said to be decidedly beyond the range of physiological difference; and it was very difficult to determine anything positively abnormal in the movements of either, considered apart from the other. Probably the state of the third pair of nerves, as recorded below, may account for this difference of the pupils. There was no corresponding difference in the distinctness of vision in the two eyes. The only case noticed in Dr. Roberts's list, in which there is any allusion to the state of the pupils, is one by Schneevogt, in the "*Nederlandsche Lancet*, 1854 (quoted from Schmidt's "*Jahrbücher*," 1855). In this case there was undoubtedly disease of the spinal cord, and the symptoms were more indicative of disorder of the nervous centres than in the case of Dr. P. After a gradual palsy of the right thumb, and of both forearms, "the speech became indistinct, and afterwards the gait became uncertain. This gradually increased to palsy of the lower limbs, without apparent atrophy. Mention is made of involuntary discharge of urine. The disease finally reached the respiratory muscles.

* I am not quite certain whether the power of deglutition can be said to have been perfectly preserved during the latter stages of the illness. The frequent complaints of pain and difficulty in the very act of eating raise a suspicion on this point, which is further increased by the suddenness of his death (not completely explained by the laryngeal symptoms). But after repeated examination into this point during life, both Dr. Adamson and I failed to obtain evidence of any real paralysis of the muscles of deglutition.

A tightness of the chest was a very early symptom." I shall have occasion to refer again to this case in speaking of the post-mortem appearances in several others in which the Cord was examined.

POST-MORTEM EXAMINATION, BY MR. BAYLDON.

In Dr. P's. case the post-mortem examination was performed with great care by my friend Mr. Bayldon, who was kind enough to accompany me to St. Andrews for the purpose; and who completed, in the presence of Drs. Adamson and Bell, a very careful scrutiny of all the cavities and more important organs of the body, which occupied a good many hours, and which I was, therefore, obliged to leave before it was quite finished. Mr. Bayldon's great experience in post-mortem examinations, no less than his general accuracy and distinguished success as a student of this school, in which he is now a valued teacher (having carried off the highest scientific honours at the University of London), induce me to place the most entire reliance upon his observations in those parts of the proceedings which I was unable to witness. The general result, as regards the organs of the thorax and abdomen, was that there was no appreciable amount of disease. The larynx alone presented anything which could be supposed to account for the difficulty of respiration experienced in the last few days of life. The appearances there were those of distinct, though very slight, *œdema glottidis*, with considerable congestion of the mucous membrane extending towards the trachea.

The arteries generally were slightly atheromatous, and the appearances of the body were those usual in moderately advanced age, the fat being in considerable volume both in the thoracic and abdominal parietes, as well as in the mesentery and omentum.

The brain, examined in every part with the utmost care, appeared strictly normal as regards both the grey and white matter. The arteries at the base, however, were considerably atheromatous: and the arachnoid from the olfactory nerves backwards to commencement of the medulla oblongata, and also in the fissure of sylvius, and about the inferior vermiform process of the cerebellum, presented distinct, though slight, opacity, with perhaps very slightly increased toughness. The opacity scarcely exceeded what is so commonly described as "miliness," and regarded as of little or no account; but after due consideration of its distribution and amount, and especially of its predominance at the base, and its almost entire absence on

the upper part of the hemispheres and in the neighbourhood of the Pacchionian bodies, I am disposed to think that it must be regarded, in Dr. P's. case, as a more than commonly morbid phenomenon. The opacity was hardly traceable beyond the pons varolii, and not at all down upon the cord.

The nerves at the base of the brain were normal, with the following minutely and carefully ascertained exceptions :—The third pair (which was near the centre of the opaque portion of the arachnoid) differed in size on the two sides ; the right nerve having a diameter of 0·08 inches, and the left 0·12 inches. To the eye the right third nerve appeared distinctly too small, and duller in colour than the left. After twenty-four hours' preservation in chromic acid, portions of each nerve were separately examined by Mr. Bayldon and myself, and also by Dr. Sanders, who was informed that the two nerves differed in size, but *not* which nerve was regarded as morbid : the general result of the three examinations being, that in the right nerve the ultimate fibres were denser and more granular than in the other to an appreciable extent ; though not occupied by any distinct morbid deposit or otherwise decidedly abnormal. The left nerve of the sixth pair was a very little smaller than the right to the eye, but the difference could hardly be measured upon the scale.

The nerves arising from the medulla oblongata and spinal cord were generally examined as to their size and other characters, without any positive result.

The cerebellum, pons varolii, and spinal cord were placed in a solution of chromic acid, grs. iij to ʒi of water, with the view of their being transmitted to Mr. Lockhart Clarke. The spinal cord was unfortunately injured at one point in being removed, but its consistence and external characters were not appreciably altered.

The sympathetic nerve in the neck was also examined, and found to be normal.

The state of the muscles in the hands and arms, is generally described in Drs. Bell and Adamson's narrative. Portions of the more atrophied muscles were examined microscopically, and proved to be at some points almost devoid of striæ ; but although very slightly granular in the ultimate fibre, they were by no means in an advanced stage of fatty degeneration. The atrophy appeared, on the whole, to have been rather succeeded by the granular deposit than to have been its consequence, as supposed by Duchenne and other observers ; and this conclusion, as respects the present case, is made more probable by the marked tendency to the accumulation of fat in the ordinary situations, rendering it unlikely that fatty matter, once deposited in the

muscles, would have been re-absorbed while the disease persisted.

I will only remark, in conclusion, in anticipation of Mr. Lockhart Clarke's observations, that in four cases only of the 105 included in Dr. Roberts's list was disease of the spinal cord detected. In one of these (No. 94), in which a very chronic loss of movement in the extremities was accompanied by phthisis and albuminuria, Virchow discovered amyloid degeneration of the posterior median columns, and a granular degeneration of the peripheral muscular branches; the anterior roots of the nerves were normal. In the three other cases there was softening of the cord in its lower cervical and upper dorsal portions, accompanied by granular corpuscles (as first described by Gluge) in both the white and grey substances. It is to be observed that in all of these cases there was much more extensive and general disturbance of the functions than in the case of Dr. P. In Virchow's case the paralysis in the end became general; there was besides albuminuria and phthisis. In Laboulbène's case (No. 95 in Roberts's list) there was very precarious health for years before the invasion of the special disease; and the symptoms are stated to have been those of myelitis (though without pain), ending in extensive muscular atrophy and disorder of the respiration. In the case by Schneevogt (No. 67), already referred to as being attended with contraction of the pupils, there was distinct paraplegia, preceded or followed by paralysis of articulation and respiration, with involuntary discharge of urine. In a case (No. 98), by Valentiner, the disease was ascribed to, or, at all events, shortly preceded by, a fall of eight or nine feet, with some local injury to the back; which, however, had not been followed by immediate bad consequences; the paralysis of the upper extremities became almost complete, and was followed by decided paraplegia, and marked paralysis of articulation and deglutition; there were great sensitiveness to lowering of the temperature, and remarkable variations in the frequency of the pulse. Death took place by bronchitis, but not until the patient had nearly lost the power of speaking and swallowing. It is probable that in this case, as perhaps in some of the others, the degeneration of the muscles was entirely a secondary phenomenon.

On the whole, therefore, the case of Dr. P. stands, in some respects, in a very different position from any case of so-called progressive muscular atrophy hitherto recorded, in which the examination of the spinal cord has been followed by positive results.

EXAMINATION OF THE CORD, &c., BY MR. LOCKHART CLARKE.

The cerebellum, pons Varolii, medulla oblongata, and spinal cord of the late Dr. P. were sent to me by Dr. Gairdner, of Edinburgh, with a request that I would examine them microscopically and ascertain whether they had undergone any morbid change of structure. On inquiry, I learned that these nervous centres had been removed two days and a-half after death; that they did not seem to be affected by any post-mortem changes; and that the body generally presented no appearance of putrefaction. Before I received them they had been placed in a weak solution of chromic acid, but not in spirit of wine. I at once examined them externally with great care. The third pair of cerebral nerves had been entirely removed. There was nothing remarkable in the appearance either of the pons Varolii or the cerebellum; but on separating the latter organ, the exposed floor of the fourth ventricle presented a peculiarity of aspect and structure which I shall describe further on. In the cervical enlargement of the spinal cord there was a deep, broad, and ragged wound, which had unfortunately been made in removing it from the vertebral column. This injury was rather more than half-an-inch in length, and had entirely destroyed the posterior white columns, with the whole of the posterior cornua or grey substance, as far forward as the central canal. The morbid change, which probably, as we shall presently see, existed at this part, rendered it, perhaps, more than usually liable to damage; and the fact should suggest the necessity of proceeding with the greatest care in removing the cord, whenever a lesion is suspected. With this exception, there was nothing unusual in the external aspect of the cord itself; neither were the anterior or posterior roots of its nerves, in any of the regions, smaller than usual to any appreciable extent.

Internal state of the cord. From the *filum terminale*, through the whole of the lumbar and dorsal region, to the lower end of the cervical enlargement, I found no actual change of structure, either in the white or grey substance; but still there was an unusual deposit which I shall describe further on. The structure was certainly rather more friable than in a perfectly fresh and healthy specimen; for when hardened in chromic acid, the elementary parts frequently separated under section; but not more readily, I think, than in healthy cords, especially of elderly persons, that have been kept a few days previously to immersion in chromic acid. In the cervical region, however, the case was different; for here there were decided evidences of morbid changes of structure in the posterior grey substance. These struc-

tural changes extended in a variable degree from the lower end of the cervical enlargement to the third cervical nerves. It is much to be regretted that the middle third of the cervical enlargement was accidentally destroyed, for it is probable that here the lesions were more extensive than elsewhere. They were also more conspicuous at its upper than its lower part. Figure 1 represents a transverse section of the right lateral half of the grey substance, with the transverse commissures and spinal canal, through the upper third of the cervical enlargement, magnified 17 diameters. But before I proceed to describe the *morbid* anatomy, it will be well, I think, to indicate the principal or most important points in the *normal* anatomy of the section; and with a view to both these ends, I have accurately drawn almost everything that could be seen under so low a power. A *a*, represents the *caput* cornu posterioris, or expanded extremity of the posterior cornu. In this region it is nearly conical in shape: the letter A is on a level with its base. The transparent lamina (*a*) surrounding the extremity of the *caput* cornu, is the *gelatinous substance*. It contains transverse, longitudinal, and oblique nerve-fibres, which are partly, at least, continuous with the posterior roots; some large nerve-cells, and a multitude of others that are small. The rest of the *caput* cornu is much darker, and consists chiefly of transverse, longitudinal and oblique nerve-fibres, collected into bundles of different sizes, the cut ends of which are represented in the figure, together with some large and small nerve-cells. The fibres are continuous with nerve-roots proceeding upward or downward from other parts of the cord. At the inner edge of the *caput* cornu, near the letter A, several of the bundles are nearly flat, so that in section they have a somewhat fusiform shape. The rest of the posterior cornu, from the base of the *caput* at A, to the posterior border of the transverse commissure, I call the *cervix* cornu.* In this region of the cord, nearly the whole inner half of the *cervix*, B, contains a number of nerve-cells of various shapes and small average size, constituting an important longitudinal tract, which I have called the *posterior vesicular column*. Amongst these cells, processes of which are prolonged longitudinally as well as transversely, many of the posterior

* The propriety of this anatomical subdivision of the posterior cornu into *caput* and *cervix* is indicated by the difference in structure of the parts so distinguished; while its convenience is here especially shown, by the facility which it affords of referring to particular parts of the posterior grey substance, and of indicating their exact relative position with clearness and precision. For further information on their structure, see my "Researches on the Intimate Structure of the Brain," first series, Phil. Transactions, 1858, and "Further Researches on the Grey Substance of the Spinal Cord," Ibid. 1859.

roots of the nerves are distributed in a complicated manner. On the opposite or outer side of the *cervix* are numerous bundles of longitudinal nerve-fibres, B', of different shapes and sizes, and in close connection with a *network* of nerve-fibres and blood-vessels. These may be called the longitudinal bundles of the *cervix*. Their fibres are continuous on the one hand with some of the posterior nerve-roots, and on the other with longitudinal processes of some stellate or crescentic nerve-cells, by which they are partially embraced. The central canal, *f*, divides the posterior transverse commissure from the decussating fibres of the anterior commissure, at the front of which is the anterior fissure, *e*. The anterior grey substance or cornu, D, contains several separate groups of large nerve-cells, and several large, divided blood-vessels; C, C, are anterior or motor nerve-roots connected with it.* Now the section represented in this figure presented to the naked eye no appearance that would excite suspicion of any lesion whatever; for the morbid portions, although numerous, were small and isolated, and would probably have passed unobserved, had not the cord been hardened, and sections been subjected to some magnifying power. When this was accomplished by means of chromic acid, and very thin sections were carefully made with a sharp razor, the posterior grey substance, even under a low magnifying power, was seen to be interspersed with a number of unnaturally transparent streaks, patches, or spots, of different shapes and sizes. In fig. 1, one of these spaces, *m*, of an irregular shape, occupied almost the whole middle of the *cervix* cornu, from near the base of the *caput* cornu to the level of the central canal, *f*.† At its anterior extremity it included two blood-vessels, the cut ends of which are represented. On its inner side it was bounded by the column of cells, B,—the *posterior vesicular column*; and on its outer side, *posteriorly*, by the longitudinal bundles, B', of the *cervix* cornu. Its middle portion, *m*, was dilated, and sent two processes outward, one of which reached a longitudinal bundle of the *cervix*. At the posterior extremity and inner side of the *cervix* was a small pyriform spot, *o*, which partly encroached on some of the longitudinal bundles of the *caput* cornu. Another morbid and larger spot *n*, was found at the side of the transverse portion of the grey substance, about midway between the anterior and posterior commissures, interrupting the course of certain nerve-

* For further information, see my "Researches," in Phil. Trans. 1859.

† To ensure perfect exactness with regard to the relative position, size, and shape of these morbid spaces, the outline of the entire section was taken by means of a *camera lucida*.

fibres which extended from both the anterior and posterior cornu to the opposite side. It enclosed the cut ends of two longitudinal blood-vessels; and I may here observe that in all the sections I examined, it was around, or at the side of blood-vessels, that the morbid appearances were most frequently found. Lastly, at *g*, on the opposite side of the central canal, *f*, and amongst fibres of the posterior transverse commissure, there was a small and somewhat triangular spot. The appearances here represented, although they differed in shape and relative position, may be considered as specimens of what were observed in other sections; and although in general they were more numerous and extensive on the right side, they were also apparent on the left, and in some sections, in an equal proportion. Fig. 2 represents a transverse section of the entire grey substance at the origin of the fourth pair of cervical nerves. The two lateral halves are seen to be unsymmetrical. This want of symmetry, however, was not the result of compression, or any kind of manipulation. *a*, is the caput cornu posterioris; *b*, the cervix cornu; *d*, the anterior cornu; *c*, the *tractus intermedio-lateralis*, or lateral part of the grey substance which projects from between the two cornua into the lateral white column; *e*, the anterior median fissure; *f*, the posterior median fissure. At *g*, are seen two morbid portions—the one heart-shaped and replacing a part both of the posterior commissure, and of the deepest stratum of the posterior white column, at the side of the posterior median fissure. The other lesion had the appearance of two oval cells placed end to end, nearly in the middle of the base of the cervix cornu. Between these and the former there were two small oval spots, lying amongst the fibres of the posterior commissure. On the opposite side of the grey substance, a somewhat triangular space, above the letter *h*, was found in the centre of the base of the cervix cornu; and another, of a circular shape, on the right of *h*, and at the base of the *tractus intermedio-lateralis*, *c*. We see, then, that the morbid spaces varied in shape, size, and relative position in different sections. In some they appeared as mere fissures or cracks, which, under a low power, might have been considered as the result of accident, if they had not been so uniformly found in only one portion of the grey substance, and more on one side than on the other. But when a sufficiently high power was employed, it became at once evident that they were not merely vacant spaces, but composed of a substance which differed entirely in its nature from that of the surrounding tissue. This substance had a delicate, transparent, and very finely granular aspect. The granules were more closely aggre-

gated toward the centre of the mass, but were generally so fine, that they could not be distinctly seen under a power magnifying much less than 400 diameters. Fig. 3 is an exact representation of one of these spots, found on the outer side of the cervix cornu, a little below the group of longitudinal bundles, (B', fig. 1) and magnified 420 diameters. It was almost perfectly oval and abruptly circumscribed by the surrounding healthy tissue, from which, however, the broken ends of nerve-fibres that appeared to have originally traversed the space, projected into it to variable distances. In the centre there was, comparatively speaking, a large tubular vacant space or short canal, *i*, which extended longitudinally for a few lines in the grey substance. Its walls were rather even or smooth, and composed of a layer of granules which were larger and more closely aggregated than those nearer the circumference of the spot. This was the only instance in which I met with such a canal. Sometimes at the edges of these morbid spaces, there *seemed* to be a kind of transition or degeneration of the surrounding nerve-tissue into the granular substance of which they were composed, as represented in fig. 4. In some instances, the broken ends of nerve-fibres proceeding from the posterior roots, were seen to project into opposite sides of these spaces, across which there was strong reason to believe that they had once been continuous.

In ascending the cord, from the upper third of the cervical enlargement, the morbid appearances diminished in extent, generally, but not uniformly, and gradually disappeared about the level of the third pair of cervical nerves. In the lower third of the same enlargement, they were very like those in the upper, and disappeared on approaching the dorsal region. In the middle third, which was unfortunately nearly all destroyed by accident, they were in all probability more extensive than elsewhere.

But in addition to these actual lesions of the grey substance, there was another unusual condition that deserves especial notice, viz., a considerable deposit of *corpora amylacea*. These bodies were thickly accumulated around the central canal, and extended in smaller numbers through the whole of both the anterior and posterior commissures, but not beyond them. They varied both in size and appearance;—in size, from about that of a blood-disc, to the 1400th of an inch in diameter; and in appearance they were either clear and plain, or marked more or less distinctly with concentric lines. They were also found in the same locality,—that is, around the central canal,—throughout the whole of the *dorsal* and *lumbar* portions of the cord, but not in so large a number as in the *cervical* region.

The *anterior* grey substance presented no marks of disease. The only fact that requires notice, is, that the large multipolar nerve-cells contained an unusual abundance of dark-brown pigment-granules, which were often remarkably *coarse*, and accumulated sometimes at one end, sometimes through one-half of a cell; or distributed around the nucleus to a variable depth, and often filling the cells.

The *medulla oblongata* had suffered no actual lesion or morbid change of structure either in its grey or white substance, but, throughout its entire length, I found a large accumulation of *corpora amylacea* around the locality of the canal, and extending in smaller numbers amongst the decussating fibres of the anterior pyramids.

The whole floor of the fourth ventricle, as already remarked, presented a very peculiar and unnatural aspect. Instead of being smooth and shiny, as in the healthy state, it was entirely paved with a multitude of granulations or small rounded eminences, which were very closely aggregated, but differed from each other considerably in size. I removed some of them for examination, first by scraping them off from the surface, to which they adhered with some tenacity; and then by shaving off a section together with a thin layer of the subjacent tissue. When examined by means of a sufficiently high magnifying power, the granulations or eminences were seen to consist of globular aggregations of the ordinary epithelial-cells, which, in a natural or healthy state, are arranged side by side, and form a smooth or level surface on the floor of the ventricle. The tissue immediately subjacent, and which consists of exceedingly fine fibres proceeding from the tapering ends of the epithelial-cells, and running in various directions, was more abundant than usual; and,—as might be expected from the homologous relation of this part to that which surrounds the spinal canal,—they were interspersed with *corpora amylacea*, but certainly not to a corresponding extent.

There was also in this region one other condition, which, although I consider it, for the most part, as a post-mortem change, I think proper to mention. This was a softened state of the central part of the medulla beneath the fourth ventricle. It began gradually about the level of the auditory nerve, and extended beneath the aqueduct of Sylvius, through the pons Varolii to its anterior extremity. In the *middle* of the pons, it reached from a little behind the continuation of the anterior pyramids to within about the $\frac{1}{4}$ th of an inch of the floor of the ventricle. Laterally, it extended from the inner side of one middle peduncle of the cerebellum to that of the other. This

softened mass, therefore, involved the following parts; 1°, the continuation, on each side, of the caput cornu posterioris, forming the principal nucleus of the large or sensory root of the trifacial nerve, together with the adjacent nucleus of its motor root; 2°, the transverse fibres which cross the middle of the pons Varolii, and proceed in front of the nuclei of the trifacial nerves on each side, where they join the middle peduncles of the cerebellum; 3°, the portio dura of the 7th, and the 6th nerves, which pass backward across the transverse fibres above mentioned to their nuclei at the floor of the fourth ventricle; and 4°, the locus niger and vesicular nuclei of the *third* cerebral nerves. My reasons for considering this state of softening as chiefly a post-mortem change, are the following: 1°. On examining different parts of the softened mass with a suitable magnifying power, I was unable to find any trace of morbid deposit, or appearance of degeneration. There was an entire absence of granular or exudation corpuscles, and no indication whatever that the softened condition was the result of inflammatory action.* It is true that the nerve-cells, although entire, were not so sharply defined as usual. Many of the nerve-fibres, also, were affected in the same way. The distinction between the white substance and the axis-cylinder was, in some instances, almost entirely lost; but then I have observed the same kind of softening, and similar appearances, in nervous centres that have been kept several days without preservation, but in which there has been no reason to suspect any disease whatever. Moreover, all the surrounding parts that had been exposed to the action of the chromic acid, were preserved from the softening process; but precisely in those particular parts where the chromic acid had no access, there was a corresponding degree of softening. Such was the case at the lower end of the fillet, and under the outer part of the superior peduncles of the cerebellum, which the chromic acid solution was unable to reach, until the cerebellum was removed. 2°. Considering the important parts which I have mentioned as involved in the softening process, if this process had been the result of any morbid action, we should expect to find in the history of the symptoms a corresponding number of grave lesions of the functions to which these parts are subservient. But this was by no means the case. There was no abolition of sensation or motion in the parts to which the trifacial nerves are distributed; neither was there any paralysis of the muscles of the face, which are supplied by the portio dura of the seventh pair; nor any loss of power over the external rectus muscle of

* Neither were there in the spinal cord any traces of exudation corpuscles.

the eye, as there would have been, had the sixth cerebral nerve been diseased. It is true that the third cerebral nerve, on the right side was found to be somewhat smaller than on the left, and that the right pupil was constantly dilated; but then the nuclei from which these nerves take their origin, were *both* softened to an equal degree, and to such an extent, that paralysis of the parts which they supply must have inevitably followed, if the softening had existed during life. Nevertheless, it is not at all improbable that there was some departure from the healthy state, and that had it been possible to harden the parts and make the necessary sections, I might have discovered certain morbid appearances similar to those which I detected in the spinal cord.*

With regard to the pathology of Dr. P's case, the wasting and loss of power in the muscles of the arms and hands must be considered, I think, to have originated, not in the muscles themselves, as a specific muscular disease, and as the consequence of some peculiar defect of nutrition, but in the spinal cord, as the result of some peculiar degeneration and softening of particular points of the grey substance. By the history of the case we learn that the loss of power and the pain *preceded* the wasting of the muscles; and that there was that muscular contraction, with flexure of the joints, which is frequent in softening of the nervous centres. The *upper* extremities *alone* were the parts affected; lesion of the cord was found only in the *cervical* region. *Both* upper extremities were involved in the disease, but the *right* was more so than the left; and on *both* sides there was lesion of the spinal cord, but most on the *right* side. Time and patient observation can alone enable us to determine whether the "paralysie musculaire atrophique" of Cruveilhier be really a specific disease of the muscular system, entirely independent of the condition of the spinal cord. There are many facts in favour of this opinion. But whether it be so or not, there is much probability, I think, that many cases which have been considered as examples of such disease, might be referable to some lesion of the spinal cord. I have little hesitation in declaring that if the cord in the case now under consideration had been examined in the way that cords have hitherto been examined, it would probably have been pronounced healthy, and that the disease would have been chronicled as a case of "paralysie mus-

* When once nerve-substance has become softened to a considerable extent by post-mortem changes, it ceases to harden by immersion in chromic acid. It may be well to state that my examination of the cord, &c., as above described, was made before I read the history of the case and the remarks by Drs. Bell, Adamson, and Gairdner.

culaire atrophique," accompanied with pain; for in some places the lesional spots, though numerous, were so small as to be quite imperceptible to the naked eye. Out of all the numerous cases recorded as Cruveilhier's disease, and collected together in the valuable and able Essay of Dr. Roberts of Manchester, in only 13 was the nervous system examined, and in 4 of these 13 some disease of the spinal cord was discovered.* There may be very obscure structural changes in the grey substance of the cord, or perhaps only in the ganglia on the posterior roots of the nerves, that may affect the nutrition of the parts to which they are subservient, without interfering with the functions either of sensation or motion; and in cases like the one now in question, where the lesions occur in small isolated spots, the limitation of disease to particular muscles, or even to particular fasciculi of any one muscle, could be explained, I think, by the particular distribution of separate nerve-fibrils within the grey substance. But when there is a prospect of deciding the question by experience and observation, it is useless to waste time in speculation.

As we have been prevented by accident from ascertaining the real condition of the most important part of the cervical enlargement,—that part, namely, which contains the greatest relative amount of grey substance, and gives origin to the greatest relative number of nerve-roots, it would not, I think, be prudent to attach much importance to any physiological conjectures that might be raised by this single case. It teaches us, however, that those particular parts of the cervix cornu, and of the transverse commissure, which had undergone degeneration, as represented in figs. 1 and 2, cannot be the centre of those changes which excite sensation in the sensorium, since there was no loss of sensibility. The violent pains experienced in the arms and hands would appear to have been excited centrally, by extension of morbid irritation to those parts of the grey substance which are subservient to the sensation of the affected muscles. Such a radiation of morbid irritation from the lesional spots to distant parts would appear to be the only explanation that can be given as a cause of the pains and sensation of "intense heat and burning" that were experienced in the lower limbs and feet; for, with the exception of the *corpora amylacea* around the central canal, there was no unnatural appearance of any part either of the grey or white substance in the lumbar region of the cord. Probably the same cause may account for the severe pains which accompanied the acts of mastication and deglutition, and even the process of

* "An Essay on Wasting Palsy." By Dr. William Roberts, p. 156, et seq.

shaving; although, as we have already seen, there may be some doubt whether the grey substance which gives origin to the trifacial nerves was entirely free from disease.*

Without dwelling any longer on this part of the subject, I will conclude with a few remarks on what my own experience suggests as the most successful method of investigating the morbid anatomy of the nervous centres. For it appears to me that if we are to arrive at strictly accurate and available results, in both a pathological and physiological point of view, the mode of inquiry must be more searching and exact than that which has hitherto been pursued.

It would scarcely be necessary to insist on the great importance of removing and examining the nervous centres as soon as possible after death, were it not that the practice is too often neglected. Great caution also should be exercised to avoid injuring the parts, so that when hardened, perfect or *entire* sections of them may be obtained for examination under the microscope. After they have been carefully examined externally, by the assistance of a lens if necessary, incisions should be made, not at random, but in a regular manner through them; and wherever there is reason to suspect the existence of disease, small portions should be removed, and examined while perfectly *fresh* under high magnifying powers. The *nature* of the lesion having been thus ascertained, the morbid parts, with some of the surrounding healthy tissue, should be removed, and after being divided, if necessary, into smaller portions, should be macerated in a weak solution of chromic acid. It is very important to cut and subdivide the parts, when necessary, in such a manner, that their relation to the rest may be recognized after they have become hardened for the purpose of making sections. In general, each inquirer must exercise his own judgment with this end in view; but for certain parts of the nervous centres some particular directions may be given. It is advisable, for instance, to divide the pons Varolii or the entire mesocephale, transversely by clean and smooth incisions made with a sharp and broad-bladed knife, into portions of about half-an-inch in thickness, and always on one side of the origin of the nerves. Thus,—unless the locality of the lesion require a different course,—one incision may be made through the crura cerebri, immediately in front of the third pair of cerebral nerves; another immediately in front of the small or motor root of the trifacial nerves; and a third

* I have shown, elsewhere, that the descending fibres of the *trifacial* nerve run down the *medulla oblongata* through the *caput cornu posterioris*, forming some of its longitudinal bundles.—Phil. Trans., 1858.

through the base of the anterior pyramids, immediately below the attachment of the sixth pair of cerebral nerves. With regard to the spinal cord, if it be cut up into small portions and hardened in chromic acid, those who are not thoroughly and practically acquainted with the exact shape and appearance of any section throughout its length, will find themselves somewhat embarrassed in endeavouring to identify each part, unless they adopt some means to assist them. Whenever it is unnecessary to cut the cord into a great number of pieces, it will be found better to divide it in three places: 1st, through the middle of the cervical enlargement; 2nd, through the middle of the dorsal region; and 3rd, through the middle of the lumbar enlargement. If, however, the lesion be suspected to exist at other points, the cord must be divided there; as it is highly important that the *nature* of any morbid portion that may be found, should be examined under the microscope in a *perfectly fresh* state; for the nerve-fibres, as I have elsewhere shown, undergo a considerable and very deceptive alteration by the action of chromic acid.* But it is no less important, and indeed is absolutely necessary for an exact and complete investigation, that *entire* portions of the cord, in the locality of the lesion, be hardened in chromic acid, so that thin, but *perfect* sections may be made for examination under the microscope. This plan affords the only means of ascertaining, as I have now done, and represented in figs. 1 and 2, the *exact form, size, and relative position* of the lesional parts—information which must be acknowledged as absolutely essential to a correct interpretation of the symptoms, both in a pathological and physiological point of view. In the present case, if the cord had not been injured at the part where in all probability the disease was most extensive, I should have made a sketch of the *exact form, size, and relative position* of every *different* morbid appearance that occurred in *different* sections; and such a plan ought to be adopted by all who desire to pursue their investigations with perfect accuracy. By the employment of these means, we should begin a new system of pathological and physiological inquiry, and arrive at results which no vivisectional experiment could possibly reach. But those who would undertake the task for themselves with any hope of success, must previously obtain a good and practical knowledge of the histology of the nervous centres.

The strength of the chromic acid solution should differ for different parts of the cerebro-spinal centres. For the convolu-

* "Observations on the Structure of Nerve-Fibre," Quarterly Journal of Microscopical Science, Jan. 1860.

tions of the cerebral hemispheres and cerebellum, the proportions should be one of the crystallized acid to about four hundred of water; while for the pons Varolii, medulla oblongata, and spinal cord, the strength of the solution may be in the proportion of one of the acid to about three or even two hundred of water. It is best, however, to begin with the weaker solution and increase its strength at the end of some hours. If the cerebral and cerebellar hemispheres be hardened in a solution of greater strength than the one recommended, they become friable and unfit for making perfect sections.

NOTES FROM DR. GULL.

I saw Dr. P. in consultation with Dr. Day, of St. Andrew's, in August, 1857, and made the following notes of his case:— Age 61. For nine years has been subject to neuralgia in the lower limbs, affecting both equally; varying in seat but not extending to the trunk. Paroxysms of pain lasting some hours, or even several days, and then disappearing for weeks or months. No other symptom than occasional feeling of languor. Five years ago began to have pain in the ball of left thumb, which wasted. Three years ago, one morning, in the class-room, whilst engaged in the usual prayers, became faint; and the speech was confused: he continued the service, and afterwards went through the duties of the class. This attack left him lethargic, and he felt a sinking at the knees. The legs were weak. In walking felt a tightness in the head, and was diffident of crossing a plank. Never had vertigo whilst sitting or lying. Fifteen months ago became more lethargic. Was soon tired on exertion. A walk of a mile would fatigue him. The affection of the arms began about this time. Had vague pains from the shoulders through the arms. The muscles of the right hand became weak and wasted. The uncertainty of gait increased. Took change of air without benefit. Legs more weak, and on two occasions gave way for a moment at the knees. Could not venture to walk down stairs. On returning home was much exhausted from diarrhoea, probably the result of laxatives.

The symptoms had been attributed to gout. For a time the pain left the arms, and fixed itself in both thumbs. It was acute and intermittent. An intense cutting, gnawing, and pricking sensation in the right hand and wrist. Wrist dropped. Muscles of left hand wasted. Almost constant exalted temperature in the feet, and a sense of heat in the hands. Complains that he suffers intensely from accessions of pain in the skin and deeper seated textures of the arms. These accessions

followed by increased weakness. Urine acid; free of mucus, pulse 110. Respiratory movements, both costal and diaphragmatic, normal. Bowels regular, unless when taking opium. Arcus senilis. Muscæ volitantes for years. Right pupil larger than left. Complexion florid. No blue line in gums.

The question when I saw Dr. P. was, whether his symptoms were due to lead. This seemed to me easily negatived by the history and condition of the patient; namely, the gradual progress and character of the symptoms, and the absence of anæmia and the blue line. The opinion, I believe, expressed, was that there was probably some chronic change in the cervical portion of the cord not in any way due to lead. I have no note of having prescribed any medicine. I think I had the impression that nothing would benefit him; and, besides, a sanguine opinion had been given that the waters of Aix-la-Chapelle would restore him to health. In this opinion I did not participate.

NOTES FROM DR. DAY.

I have read the case carefully, and really do not feel that I have anything to add to it; my own shattered health since August, 1857, having prevented me from seeing much of Dr. P., since that time. The following are the only points that struck me:—

Page 4, line 4.—When he fancied he was not seen, he was frequently observed by his housekeeper to walk actively about his library and take down and replace books. This he would have solemnly declared to have been an impossibility, if he had been asked to attempt it. I refer to a period of about 4 months before his death.

Page 5, at bottom. Besides his urine, 3 gallons of the water from his cistern were analysed, without a grain of lead being found.

Page 9, middle.—I have a very strong impression that the dilated right pupil existed before there were any obvious manifestations of his disease. I am almost certain, at all events, that it existed in 1849, when I first saw him.

Perhaps I cannot give a better illustration of Dr. P's. peculiar state of mind than is afforded by the following brief anecdote. An intimate friend calling one day found him reading "Forbes' Essay on the progress of Instruction and Physics," a rather thin quarto. "Ah," said the friend "I am glad to see you strong enough to hold a book of that size." Down falls the book *instantly*. "Oh you don't know, and can't pity the weakness of my hands."

CLINICAL REMARKS ON THE EXFOLIATION OF MUCOUS MEMBRANES FROM THE WOMB AND THE VAGINA DURING MENSTRUAL PERIODS.

By E. J. TILT, M.D., M.R.C.P.,

Consulting Physician to the Farringdon General Dispensary and Lying-in Charity, &c.

PLATE II.

THE structure of the membranous substances which sometimes come away from the womb or the vagina has been accurately determined, but so little is known respecting the conditions in which these products originate, and our means of modifying these conditions are so limited, that I am induced to publish two cases which recently came under my notice. They convince me that such cases are more frequent than is supposed, and that patients are often attended for a long time without drawing attention to what is a sufficient reason to explain an almost indefinite prolongation of the disease. The length of time during which the shedding of the uterine mucous membrane may occur at menstrual periods, explains why so few cases are followed out for a long period, or until the morbid condition has ceased.

Case 1.—A lady, aged 25, of middle stature, healthy complexion, with brown hair and eyes, came to consult me in September, 1860. With the exception of an unusually severe coryza, which had lasted for years and been attended by a very abundant discharge of mucus, the patient had always enjoyed good health until she married at 23. Menstruation first came at 15, and continued regular until marriage; but ever since that period it became more painful, and was almost always accompanied by the passing of some flesh-like substance from the vagina. She was also annoyed by the frequent coming away of a large quantity of a gluey discharge, which did not yield to a very judicious combination of tonic medicines, prescribed by my friend Mr. Hammond, of Ipswich, who likewise ordered vaginal injections, and as there was no pelvic pain and none in the back. No examination had been made. Until two months previous to consulting me, the patient's general health had not suffered, but lately she had complained of feeling weak and

nervous. I found the neck of the womb congested and painful, both lips of the os uteri were deeply excoriated, and so red as to resemble a large raspberry. I considered this to be an instance of uterine inflammation produced by marriage, and the case improved under the influence of an occasional application of the solid nitrate of silver or of its solution. The menstrual period had become due, a small quantity of red mucus was daily passed. When she called on November 20th, I told her to put the feet in hot water, to inject warm water into the vagina, and to apply hot poultices to the abdomen. This brought on the menstrual flow, but it was so profuse and so very painful that Mr. Powell, of Wandsworth Road, was called in. In what was passed, he detected an unbroken sac, which, on being opened was only found to contain liquid blood, and no trace of a fœtus could be discovered by this experienced practitioner. When I saw the patient on the 26th, she was still debilitated by the loss of blood; there were no abdominal pains; no pains on pressing above the pubis; but the neck of the womb was very sensitive to pressure, the eroded surface was of a more fiery red, and there had been more ropy discharge. I coated the abraded surface with the solid nitrate of silver, ordered alum and zinc injections, advising mercurial ointment and extract of belladonna to be rubbed into the skin above the pubis twice a day, and iodide of potassium to be taken in a compound infusion of gentian.

The uterine cast, when brought to me three days after maceration in spirit, was in two fragments, as represented in Plate II, figs. 2 and 3. When adjusted they remind one pretty well of the cavity of the womb regularly distended. Each fragment is about two inches and a-half in length, an inch and a-half wide, and about a line in thickness. One side of these membranes has the rough and floccular appearance of the decidual membrane as it is detached from the womb, and the other side is soft, smooth, and punctuated like the inner surface of the same membrane by the openings of the uterine glands.

This case is well worth discussion. Health was perfect until marriage. Marriage so influenced the womb as to cause it to detach, more or less, its mucous membrane at every menstrual period. Raciborsky has proposed a simple solution for this occurrence by admitting pregnancy and a very early miscarriage in all cases of membranous dysmenorrhœa; but decidual membranes are passed at menstrual periods by virgins, by widows, by women at the change of life, and by married women living apart from their husbands. With regard to my patient, menstruation was regular, there was no sickness, nor any other

sign of pregnancy, no portions of a fœtus were found by Mr. Powell, nor by Mr. Hammond on four subsequent occasions. Thus it is clear that sexual influence, operating directly on the womb, or mediately, by the ovaria, had caused the periodical exfoliation of the uterine mucous membrane, the prime morbid element of the case. What is the nature of this morbid element? For the last two years there has been no evidence of chronic inflammation of the womb during intermenstrual periods, no fixed pain, no red or brown discharge, no nausea; so I cannot give the name of inflammation to a process of the womb which only occurs at each menstrual period. This case confirms Dr. Oldham's idea, that the mucous membrane of the womb exfoliates under some influence independent of inflammation, much better than the cases he has himself adduced; for in his cases, uterine disease existed previous to the passing of the decidual membranes, and a relation of cause and effect might fairly be supposed to exist between the chronic inflammation of the uterine mucous membranes and its exfoliation, as I have shown elsewhere,* and as it has been stated by my friend Dr. Bernutz.† Did uterine exfoliation occur at every menstrual period since marriage? The patient's report is probably correct, for ever since attention has been awakened to the fact, the membranes have always accompanied menstruation. Since the membranes were passed which I have depicted, I have learned from Mr. Hammond that in January two portions of decidual membranes were expelled with considerable hemorrhage; "that in February, two portions were passed, and although not a cast, he believed it was the lining membrane of the entire uterus." The same occurred in March last, and at every menstrual period except one, up to the September of 1861. In this case I stated, that the prime element is that morbid performance of menstruation which leads to exfoliation of the uterine mucous membrane. The inflammation of the neck of the womb is a secondary element of the case, and was caused by the forcible distension of the neck of the womb necessary to let pass so voluminous a body as that of which I have depicted the fragments. Inflammation of thousands of mucous follicles that line the cervix, explain the abundant ropy discharge; and its alkaline nature accounts for the extensive excoriation of the os-uteri. The monthly repetition of expelling a voluminous body through the neck of the womb, prevented tonics and injections being of much use, and counteracted the usual curative effects of nitrate of silver. I have never met with a case of deciduous dysmenorrhœa which was not accompanied by uterine inflam-

* *Lancet*, 1853.

† *Clinique Médicale des Maladies des Femmes*.

mation; but is this the cause of the exfoliation, or merely a sequel? As in my case so in many others, doubtless the inflammation of the neck of the womb is only the sequel, and could not induce that condition of the body of the womb which causes its mucous membrane to exfoliate. It is only when distinct symptoms of internal metritis are met with between the menstrual periods, thereby rendered menorrhagic and unusually painful, that inflammation of the body of the womb and the exfoliation of its mucous membrane can be fairly considered to stand as cause to effect, and very few recorded cases contain sufficient evidence to solve the question. As a proof that exfoliation is sometimes connected with uterine inflammation, I may mention that in four of the worst cases of chronic internal metritis that I have met with during the last twenty-five years, the patients had long been in the habit of passing membranes at menstrual periods, although they no longer do so, the menstrual flow being absent or very scanty.

The prognosis of this case is bad. I have kept off the exfoliation for a month or two by leeching the womb before menstruation, and by adopting the treatment advised in this case. The tendency to exfoliation has sometimes worn itself out; after continuing many years, patients have often become disheartened at obtaining no relief, and have sought other advice; and I do not remember being able to attribute the radical cure of similar cases to any one remedy. I have, however, greatly relieved my patients by a judicious plan of treatment.

1. The constant coincidence of uterine inflammation as cause or effect, shows the utility of leeches being applied to the neck of the womb either before or after the menstrual periods, the utility of cooling or astringent injections, and of mercurial and belladonna ointment being applied to the abdomen.

2. The unhealthy condition of the os-uteri and its excoriation render it necessary to touch the parts occasionally with the solid or liquid nitrate of silver.

3. Stricture of the womb often renders dilatation advisable. Even when it does not seem that dilatation of the cervical canal be absolutely required, I have dilated it, with the view of accustoming the neck of the womb to allow the passage of a foreign body without too much pain, and feel confident that I have thus given great relief.

In a little work by Dr. Vannoni, of Florence, there is a case worth translating, so that it may be better known.

Case 2.—Maddelena Marinelli had been married six years when she consulted Dr. Vannoni. She had never borne

children, and for the last three years connection had been very painful. A polypus was found and extracted from the neck of the womb. After its removal the neck of the womb was very sensitive to pressure, and there remained a permanent state of distress and soreness, rather than pain in the right iliac region, micturition was interfered with, and menstruation had not reappeared, when, on the 2nd April, 1832, five months after the operation, and at a menstrual period, frightful abdominal pains caused fever, with delirium and convulsion. The abdomen could not be touched without giving intense pain. This state of things lasted for three days, when blood passed from the vagina, at first in small quantities, then abundantly. On the third day of the menstrual flow, a considerable substance came away, and menstruation continued for the three following days. Externally viewed the substance was red, soft, and smooth, with red dots, more numerous in that portion which had lined the fundus of the womb. The upper portion of it was wider than the lower, and terminated by prolongations, which seemed the casts of dilated Fallopian tubes. The lower portion was cylindrical. The whole body was two inches long and ten lines in width from one oviduct to the other, and seven lines at its lower extremity. On being opened, it was found to be a sac, with an upper cavity of a triangular shape. The inner surface had a velvety floccular appearance, and with a strong lens it was easy to distinguish numerous vessels. It became white on being macerated in water. Dr. Vannoni gives no further particulars of the case, but devotes sixty pages to prove that this membrane was the exfoliated mucous membrane, considering it the result of acute metritis, and comparing it to the cast of an œsophagus which was once brought up, by a patient of his, who had swallowed nitric acid. This perfect cast of the womb is represented in fig. 4, Plate II. As the mucous lining of the womb was detached and forced down, it became inverted, which will explain the fact of the floccular appearance being found inside instead of out, as is usual.

A case related by Chaussier, in his letter to Madame Boivin explains Dr. Vannoni's, for Chaussier says, that he found a tumour hanging from the neck of the womb, with its most voluminous extremity dependent, as if it were a polypus, but the tumour was soft, it easily came away, and was full of blood. It was a cast of the womb, which cast had become inverted.

Occasionally at menstrual periods, membranous substances are passed by the vagina, resembling those of which I have already treated, and I believe Dr. A. Farre was the first to point out that these pseudo-decidual membranes are detached from the

vagina and not from the womb. His communication in the first volume of the *Archives* contains little clinical information respecting these singular products, so I think it is well to relate the following case respecting which opinions may be divided:—

Case 3.—A highly respectable, strong, healthy-looking woman, aged 24, consulted me on the 26th of February, 1861. Menstruation came at 14, was quite regular, not very abundant, but very painful until her 20th year, when she began to suffer so much with bearing-down pains, pains in the back, and had so much difficulty in getting up and down stairs, that she was obliged to give up her place as lady's-maid. Menstruation was unusually painful; leeches externally applied, and blisters, gave no relief. She was for a time under Dr. Simpson. No painful treatment was adopted, carbonic acid injections were made three times, and a sponge pessary ordered and worn for a year. This treatment had been continued without favourable results for three years, when I saw the patient. On careful examination I found a virgin womb, apparently healthy, with the exception of its being lower down than usual. The patient complained of bearing-down and back pains coming on soon after she walked or stood about; otherwise she felt well, so I merely ordered alum vaginal injections to be used twice a day. There was no fixed surpubic pain, no brown or red discharge, which so often indicate inflammation of the lining membrane of the womb. A few days after she brought me a membranous substance which had come away with a blood clot during an unusually painful menstrual period. On examination I found nothing unusual in the appearance of the womb nor of the upper part of the vagina; nevertheless I ordered the patient to rub into the skin above the pubis, an ointment made of extract of belladonna and mercurial ointment. The drawing fig. 1, Plate II is a very accurate representation of the membrane which was passed. Its upper portion is evenly defined, like the plait of a folded bladder, with rounded angles, without openings for the Fallopian tubes. Its lower outline is irregular, jagged, and filmy, as if irregularly torn off from an extensive surface. It is about 2 inches broad and $1\frac{1}{2}$ in length. It must have lined a vaulted region, and its two sides must have been pressed against each other by a blood clot, or some other substance. Both sides of this membrane are very much alike. It is not thick and pulpy, like decidual formations, but thin, and, after immersion in spirit, looks like soddened parchment, here and there stained with blood. It has not on one side the cribriform appearance resulting from the opening of the uterine glands.

On being examined microscopically by Dr. Beale, pavement cells were distinctly found.

Has the condition which led to the formation of this membrane any relation to the patient's sufferings for the last four years? I do not know this to be the fact, but I believe it to be so. Did she ever during that period pass similar membranes? Probably; for during the following catamenial period she passed a solid substance, but as it was partly decomposed, I could only ascertain that it was similar to the one I have described, only thicker by superposition of membranous flakes. On the 21st of April, she had just menstruated with little pain or clots, and no membrane had been passed. The patient was certainly better, had less pain, could walk more, and was told to continue the mercurial ointment, the injections, the cold sponge-bath, and to rest a couple of hours on the sofa in the middle of the day. On the 22nd of May, menstruation had ceased; a few clots, but no membranes, had been passed, with slight pain. The patient is going to the sea-side, will bathe, and continue to use astringent injections, but leave off the mercurial ointment, which has been continued three months. I sanctioned the patient's being married in three months, believing that it would be rather beneficial than detrimental, particularly if pregnancy were carried to full term,—a rare occurrence, for sterility is common when the womb exfoliates its mucous membrane at catamenial periods.

The foreign body passed by this patient is so similar to one observed by Dr. Farre, that I might have used his words in describing my preparation. The absence of the cribriform appearance, the thinness of the membrane, the presence of pavement cells, led him to admit that it came from the vaginal cul-de-sac, but it may be first argued on general principles that the structure of mucous membranes becomes so modified by inflammation, that pavement cells might possibly be developed in the mucous membrane of the body of the womb, which was composed of ciliated epithelium in its normal condition, and however singular this position may appear, it is assented to by Dr. Beale. Arguing from the peculiarities of the case, it may be said that the membrane does not clearly shew its vaginal origin by a well defined tubular shape, by bearing the impression of vaginal rugæ and by presenting a cup-like depression made by the extremity of the neck of the womb, as in other specimens delineated by Dr. Farre, about the vaginal origin of which, there can be no doubt. The membrane is exactly like a fragment of a collapsed bladder, so long folded that the plait remained permanent, and one can understand that this was done by

pressure of the blood against the side of a distended womb; but I cannot understand how this could have taken place in the vaginal cul-de-sac. Moreover, it is not rare in certain forms of vaginitis for the epithelium to be thrown off in large shreds, which look exactly like the film on the surface of liquid paint when exposed to the air. In such cases there is a certain amount of redness and sensitiveness of the vagina, whereas I found the vagina perfectly healthy on examining my patient, once immediately after menstruation, and again immediately before and after a subsequent menstrual period, on two occasions when the membranes were passed. Neither this patient, nor that patient of Dr. Farre who passed an exactly similar membrane complained of rawness and vaginal distress which were marked symptoms of the cases related by this accomplished observer in which the product was evidently detached from the vagina. It would be singular, if, while the exfoliation of a thin pellicle is accompanied by distinct symptoms of vaginitis, the exfoliation of a much denser substance from the vagina should give rise to none at all. For these reasons I believe that this membrane, although differing from the well-known decidua membranes was still formed in the body of the womb, but the question requires to be reconsidered by the light of other cases.

A CASE OF ACUTE WAXY DEGENERATION OF THE LIVER AND KIDNEYS.

By E. H. SIEVEKING, M.D.

Fellow of the Royal College of Physicians, Physician to St. Mary's Hospital.

Case.—Geo. M., an errand boy, æt. 16, well-built, and having always enjoyed good health up to the commencement of the present illness, came under treatment at St. Mary's Hospital on December 4th, 1860. The only fact about his previous mode of living bearing at all upon his illness, which I subsequently ascertained, was that he was passionately fond of fishing. In the pursuit of his hobby he was often exposed to wet and cold; and notably one night last summer he slept in the open air, in a hayrick, in order to be in good time to commence sport in the morning. His circumstances were easy, and there was no appearance or trace of any hereditary taint.

He had felt general pains in his limbs for about two months past, and was troubled with slight cough; there was some effusion under the left patella. His usually florid complexion had left him, and he had become pale and emaciated. He complained of general debility more than any other symptom. The skin was rather sallow than jaundiced, the urine high coloured but not containing any biliary matter, the tongue clean, the pulse 116. There was persistent constipation, and trifling pain in the region of the liver. On undressing, the whole

upper and right side of the abdomen was evidently full and distended, and on closer examination the liver was found to be very much enlarged, extending from the sixth rib to within two inches of the umbilicus, and stretching across the epigastrium into the left hypochondrium. The surface of the liver was perfectly smooth, and appeared to be elastic, though neither fluctuation nor hydatid remitus were discoverable. The lad had noticed the enlargement of the abdomen only for one week. At the ensiform cartilage, the right half of the body was half an inch larger in circumference than the left side. When he was first taken ill, he had pains all over, and particularly in the middle of the back. At first he occasionally felt sick, but never vomited. It was only during the last month that there had been any loss of appetite. The view taken at the first consultation was, that the lad was labouring under intense congestion of the liver, to which alone the great enlargement of the organ seemed referrible. He was ordered a purgative powder of calomel and jalap, to be taken every morning, and to have eight leeches over the liver.

December 5.—The leeches have entirely removed the pain in the right side, the bowels have acted; the urine is turbid, of a dirty yellow colour, acid, sp. gr. 1024, contains copious lithates and some albumen, but no bile pigment. Tongue dry, there is thirst, the pulse 116 and small.

December 7.—The left knee continues swollen. The abdomen seems a little reduced in size, but on measurement exhibits the same dimensions. To have an ounce of sulphate of magnesia mixture twice a day.

December 11.—The hepatic dullness is somewhat increased downwards; there is some tenderness over the right lobe; the bowels are well open; the pulse is 120, small; the tongue is clean, there is thirst; the urine is clearer. Repeat the sulphate of magnesia mixture twice a week, and take steel wine two drachms three times a day.

December 14.—General symptoms the same, but the emaciation is increasing; the urine reported as being quite clear.

December 29.—The urine has again become dark. There is more tenderness over the hepatic region; the bowels are open, but the motions are pale, very light coloured. There is great thirst, and a quick pulse. He has no sickness. For four nights has had no sleep. To have extract of taraxacum one ounce, decoction of cinchona eight ounces; of this, take one table-spoonful twice a day, and the Epsom salts as before.

January 1, 1861.—Looks more anæmic, and emaciation continues. There is more abdominal pain; he feels sick, and has no appetite.

January 4th.—Entire loss of appetite; increasing emaciation. There is much pain over the lower abdomen, and great thirst. The urine is of a brownish red colour, and contains much albumen. Two nights ago there was much dysuria. The motions are dark. Repeat the mixture. About this time he ceased attending at the hospital. I therefore visited him at home; hitherto there had been no material alteration in the form or size of the liver, to which attention had been chiefly directed, but on

January 8, I discovered a very marked reduction of this organ; it had shrunk since the last examination up to the margin of the ribs, and the dullness did not reach higher than previously, viz., to the sixth rib. The lower edge felt hard and sharp, and could be readily grasped in its whole extent. At the same time there is general pain over the whole abdomen, which is resonant on percussion, but not distended. The urine is clearer; the pulse 100, full and soft; the tongue furred and brownish. To apply leeches to the abdomen. The opinion which lately had been fluctuating somewhat regarding the nature of the disease, seemed now rather towards the view that the case was one of hydatids, that these had burst, and had given rise to peritonitis; but the peritonitis was scarcely severe enough to justify this view, though the sudden reduction clearly indicated the impossibility of our having to deal with medullary cancer, which the rapid growth of the organ, the youth of the patient, and the great and rapid emaciation had seemed to indicate, when the treatment directed against the congestion, and continued for some time, had apparently failed to reduce it.

January 9.—Had a good night after the leeches, which have much relieved the pain. Tongue clean, pulse 92, thirst less, urine clearer. Abdomen still a little tender, percussion of liver the same as yesterday. Bowels costive. To have castor oil.

January 16.—The symptoms continued much as at last report for some days; on this day the account is:—There was much pain in the abdomen last night, so as to prevent sleep. The liver is felt just below the margins of the ribs. Except round the umbilicus, where the percussion is tympanitic, the abdomen is dull, and there is distinct fluctuation at the lower third. When the hand is laid flat on the left upper side of the abdomen, and the patient breathes deep, a distinct crepitus is felt; pulse 88. Great thirst. Tongue clean; appetite pretty good, but he fears to eat, on account of the pain in the stomach, which shoots up the left side of the chest. Urine very thick and dark. Bowels open. On account of the evident return of peritonitis, six leeches were applied to the left side of the abdomen, and the following powder given three times a day:—℞ Hydrargyri cum Creta, gr. ij, Pulv. Ipecac. Co. gr. vj.

January 19.—The bowels are very costive, were moved once last night. Since last visit has been very sick, and has vomited some blood. Increasing emaciation. There is less pain in the abdomen, which, however, is more distended. He has slept pretty well. The tongue is clean, but rather dry. Pulse 104, full; the urine brownish, very dusky, and acid.

January 21.—Much as at last report. The urine is turbid, dirty yellow, and strongly albuminous. Examined by the microscope, it exhibited epithelial casts, with blood corpuscles and epithelium scattered over the field. The casts or epithelium more or less discoloured by hæmatine. There was also large pavement epithelium, and numerous minute uric acid crystals.

January 23.—The vomiting continues, the ascites appears to increase, but there is no œdema. The urine continues the same. The pulse is feeble, 84; the tongue moist, slightly furred; there is no appetite, and he sleeps badly.

January 26.—On the 24th instant, he had copious epistaxis for twelve hours; there is a purpuric rash on both legs. The motions are reported to be very dark. The anæmia is extreme.

February 1.—Bowels not moved since last visit. The urine very scanty; the emaciation and anæmia increasing; the pulse very feeble; the tongue swollen. Had four convulsive fits (uræmic) last night, for the first time in his life; for several days has vomited bilious looking liquid. Was asleep during the visit, and too drowsy to be examined minutely.

He died on the following morning, after a repetition of the convulsive seizures. From 1 a.m. up to the fatal event, he had about nine attacks, and was quite insensible in the intervals. Death took place during a convulsion; there had been no return of the hemorrhage, but the purpura on the legs endured to the end.

POST MORTEM, Feb. 3rd, 22 hours after death; assisted by Mr. Staples.

The body was much emaciated; the rigor mortis had almost entirely disappeared; the purpuric spots still visible on legs. Only the chest and abdomen were examined. On opening the latter the first thing that struck the observer was the large amount of blackish pigment in the omentum, on the upper part of which, towards the spleen, there was some recent fibrinous exudation.

Spleen much enlarged, measured 9 inches by 4, and appeared to be about 2lbs in weight, of a purple colour, and having fibrinous exudation over the whole outer surface, and

evidently quite recent. Two "fibrinous" blocks showed on the outer surface of the spleen, of a pale yellow colour; the one at the upper, the other at the lower part, dipping deep into the structure of the organ, and having (as usual) a sharply defined margin. One was of the size of a walnut, the other of a filbert. The structure of the spleen otherwise appeared normal. The upper part of the spleen was adherent to the left lobe of the liver by tough adhesions. The lower edge of the spleen was in contact with the left kidney, the upper third of which was of a purple colour, as if stained by the spleen, but microscopical examination subsequently showed the discoloration to be due to the deposit of black pigmentary matter in the canaliculi.

The *liver* was smooth on the surface, and showed considerable fibroid thickening of the glissonian capsule, its weight was guessed at 3lb. The whole organ was very dense and hard, and at a distance presented a dark reddish-brown hue, as if congested. On section, however, it was found to contain little blood, and to cut very hard and dry, but without any appearance of fatty deposit. On close examination it presented a finely marbled appearance, as if containing a large amount of new matter or deposit, disposed with tolerable regularity among the proper hepatic tissues. This "new" matter had a translucent, horny, whitish appearance, and pervaded the entire organ very equably. The intervening red tissue looked granular in comparison; the former predominating somewhat. The gall-bladder was full of dark green bile.

The *kidneys* were both alike; the upper ends of a dark blue colour, which penetrated into the organs to a considerable depth. The capsule was not adherent in either, and their surfaces were perfectly smooth. But the latter presented the same marbled appearance which was noticed in the liver, and on section there seemed to be the same "new" matter or deposit through the cortical tissue of both kidneys, exhibiting a pale yellowish or whitish, finely granular appearance. Both kidneys were rather large. The *bladder* was full and distended. There was a small quantity of fluid in the peritoneal cavity. The stomach and intestines were not minutely examined, but appeared healthy.

Both *lungs*, but particularly the right, were very strongly adherent; except some hypostatic congestion, the tissue of both was perfectly healthy; there was no tubercle.

There was a small quantity of serum in the pericardium, which had a little fibrine on the surface. The heart was pale, flabby, and all its cavities quite empty. There was a large

fibrinous excrescence attached to the aortic valves, and extending to one of the curtains of the mitral valve.

Microscopic appearances.—Fine sections of the liver showed the deposit to surround chiefly the intralobular veins, which were empty; while the little blood that remained filled the interlobular veins. The deposit had a semitranslucent horny or waxy appearance, its margins were well defined, it contained no trace of oil, nor was there any oily matter to be seen throughout the organ. Nor was there any appearance of pigment in what I have called the deposit. Under a high power, the so-called deposit proved to consist entirely of hepatic cells in a state of extreme atrophy, perfectly transparent without a trace of oil or pigment. The cells were not fused or broken up, as seen in cases of extreme waxy degeneration, but were defined in outline though varying much in shape and size, evidently undergoing metamorphosis. The kidneys presented exactly the same degeneration as the liver. The epithelium being wasted in the same way, having a glassy or waxy appearance, which was peculiarly marked in the malpighian corpuscles.* The yellow blocks in the spleen consisted of granular and corpuscular fibrine, without trace of organization; the same was the case with the deposit on the cardiac valves, but here there was also some crystalline deposit of mineral matter.

Remarks.—It appears evident that the original view, that the enlargement of the liver was due to congestion, was the correct one. It appeared negatived at first by its persistence in spite of treatment, and by the extreme weakness and increasing emaciation of the lad, and the only reasonable conclusion then seemed to be that the disease was one of encephaloid growth. When, however, within a few days, a sudden reduction, followed by symptoms of peritonitis, took place, it naturally suggested itself that there might have been a rupture of an hydatid cyst, though this view did not gain much hold from the comparative slightrness of the peritonitis. In short, although at last the uræmic poisoning, the scorbutic epistaxis, the purpura, and other symptoms of entire decomposition of the blood, left no doubt as to the degenerative character of the disease, it was left for the autopsy satisfactorily to account for the whole train of occurrences. I should be disposed to view

* The cortical part of the kidneys also exhibited a considerable amount of black, amorphous pigment. Drawings of the naked-eye and microscopic appearances were taken, but it is thought that the descriptions given may suffice to render them intelligible.

them briefly thus : In consequence of the catarrhal influence to which the boy, previously in perfect health, was exposed in the latter part of the summer of 1860; he had a subacute rheumatic attack, with incipient degeneration of the kidneys. This was not attended to, and consequently congestion of the liver took place, which reached the extraordinary extent which it had when I first saw him. At this time the kidneys were but slightly affected; in consequence, however, of continued purging, and more still from the kidneys putting on fresh diseased action, and becoming themselves very much congested (the urine at one time being persistently bloody), and also from the spleen enlarging considerably, the liver became reduced in size. The degenerative process had in the meantime been established in the liver, and continued to progress. The chief depurative organs of the body being diseased to the extent shown after death, and the central organs of circulation being also materially impaired, it was only a wonder that death was so long postponed. The exact period at which the heart became affected cannot even be surmised upon the vital symptoms, because no cardiac symptoms were ever noticed; from the post-mortem evidence it is probable that the deposit on the valves took place early in the disease, probably after the morbid affection had commenced in the kidneys. I should accordingly determine the succession of disease in the different organs in the following order,—1, kidneys; 2, heart; 3, liver; 4, spleen, and kidneys a second time.

It has been suggested to me, that the whole view about an enlargement of the liver was a mistake. Upon this point, however, I have no doubt. The upper margin of the liver never varied, and the organ was repeatedly percussed, in the presence of students, with too great care to permit of the possibility of any doubt on the minds of those who watched the case. Besides, there never was anything in the thorax to push the liver down, nor was the distension of the abdominal cavity ever such as materially to influence the position of the liver. I much regret that no analysis could ever be made of the fœces, of the vomit, nor of the perspiration; the case might have been exploit   in many ways more than I have done, more particularly with regard to the amyloid question, but the opportunity and time was wanting to complete it as it would have been desirable.

Such as it is, however, it has appeared to me to be sufficiently remarkable to bring before the profession, the more so as it is the first case published in which there is reasonable evidence of the period within which waxy degeneration takes place, and an

account of the course of the entire disease from beginning to end. The whole period only amounting to four months, we should not be far wrong in calling it a case of acute waxy degeneration of the liver and kidneys.

CASE OF RUPTURE OF THE HEART, CONSEQUENT UPON WASTING
AND SOFTENING OF THE MUSCULAR TISSUE.

By J. T. ARLIDGE, M.B., A.B., M.R.C.P. Lond.

Physician to the West of London Hospital.

Case.—W.E., æt. 66, an independent gentleman, consulted me in February 1860, on account of a general feeling of illness, accompanied by uneasiness and pain, chiefly in the left hypochondriac region. This pain frequently extended across the epigastrium to the right side; became worse about an hour after taking food, when it was also felt between the shoulders and beneath the left scapula. There was considerable flatus from the stomach, with nausea; and a few days previously he had vomited food, a circumstance he attributed to having taken some medicine containing morphia. Pulse 80, weak, very compressible, but regular; skin soft, moist. Tongue covered by a soft, white coat; dry, according to his statement, in the morning. Bowels open daily, but less freely, for the last few days, than usual. Evacuations well coloured with bile. Urine in sufficient quantity, but loaded with lithates. No marked sallowness of face or of conjunctivæ; but the features appeared relaxed, and the countenance was indicative of feebleness.

Two or three days before consulting me he had taken a blue pill and a black draught, without relief, however, of his symptoms. Had taken little food, and drunk only very moderately of sherry. Moreover about ten days before, he experienced, on one occasion, a feeling of faintness, and afterwards complained of an aching in the neck, shoulder, and arm of the left side; this he attributed to the effects of cold, and obtained relief by wearing flannel over the affected parts. There was no loss of power in the arm and hand, nor was the sensibility affected in them.

He was a man of short stature, but well formed, and had a well-developed chest, was partially bald and rather grey. He had been living privately for 26 years; leading a very quiet life with his family; living regularly and frugally at home, and, although he always drank wine, he was abstemious, and mostly took sherry or claret. At the same time he was not indifferent

to good living, and was able to indulge in it sometimes, as he was a member of a wealthy city company. However, when he did indulge in eating and drinking, beyond his custom, he suffered pain in his chest, and dyspepsia. He was of a nervous, sanguine temperament, active, and fond of being busied in parochial matters.

Altogether he had enjoyed good health; about 10 years ago he had an attack of "bilious fever," with severe and long-continued vomiting, and followed by great debility. Since then he has had no serious illness, although he has often suffered from pain in the chest and dyspeptic symptoms, for which he has had advice; and on three occasions his chest was examined, one medical man stated that there was heart disease; but the other two, in whom he had particular confidence, assured him of the perfect soundness of the heart. And it should be remarked, that there never were any secondary or general symptoms of heart disease.

The eminent surgeon, whom he usually consulted, told him he suffered from disorder of the liver, and treated him with the iodide of potassium, carbonate of potash, and aperients; and he attributed the pain in the chest to muscular rheumatism; but neither rheumatism nor gout had ever shown themselves elsewhere. Under the advice of his medical man, he went to Brighton, and took about a dozen hot sea-water baths, at as high a temperature as he could bear, but without material benefit.

I prescribed for him a simple aperient mixture and pills. After seeing me, he walked for about a mile. During the night he was restless and complained much of the pain across his chest. A hot bran poultice applied gave little relief. His wife observed his breathing to be quicker than usual, and that he appeared very uneasy. However, he got through the night, rose about 8 o'clock, dressed and went down stairs; told his wife and daughter he felt much as usual. On coming down stairs he went to the water-closet, and after being there a short time, was heard to fall and to groan two or three times. I saw him almost immediately; found him lying, doubled up in the narrow space within the closet, and quite dead. The body cooled very rapidly, was at first pallid, and then for a short time, dusky.

On the third day after death, I made a post-mortem examination. Skin peculiarly soft, smooth, and wax-like in appearance; slight discoloration on the under surface of the body. About an inch of firm, but oily subcutaneous fat. Muscles deeply coloured. Chest—lungs healthy, without adhesions;

containing much blood of a venous hue, particularly in their dependent parts. Diaphragm thrust upwards by distension from flatul in the abdomen. Considerable fat in the anterior mediastinum and about the pericardium. This last was greatly distended, and on cutting into it, a large quantity of dark sanguineous fluid escaped, and afterwards masses of soft, dark, clotted blood; which, besides filling the pericardium, had stained its inner surface. On raising the heart, an irregular fissure was seen in the front wall of the left ventricle, about one inch from the apex, and rather above an inch in length. Its border was irregular, and the surrounding tissue readily broke down into a pulpy mass. The tissue was deeply coloured, soft, intermixed with dark grumous matter, and entirely destitute of its muscular characters. On opening the ventricle, the whole of its interior, from the site of the rupture to its conical apex, exclusive of the interventricular septum and the portion just within the mitral valves, was found in a disintegrated state, its surface irregular, and of a dusky grey colour. The softening and atrophy of the muscular tissue of the ventricle had proceeded so far, that its wall was reduced to one-fifth of an inch in thickness. This change in structure extended on each side as far as the septum, which was itself unaffected. The mitral valves contained no calcareous deposit, and although their muscular columns were rather softened, they had been able to maintain their action. The aortic semilunar valves were healthy, except that the little corpus arantii of each had a small deposit upon it of calcareous matter, in the form of little spicula, projecting in a stellate or tuft-like form. The semilunar valves of the pulmonary artery had no such deposit. The right ventricle was smooth internally, as usual; its walls were thin, and their muscular tissue atrophied. The tricuspid valves were diseased, having a blood-coloured, pellucid-looking deposit in their thin membranous portion, causing a certain amount of thickening.

A large quantity of yellowish, firm, and rather transparent fat, surrounded the auricles and the base of the heart. The coronary arteries, both at their origin and in their course, were converted into calcareous tubes; whilst the aorta was itself largely occupied by similar calcareous deposit. The whole heart was rather small, and its muscular tissue throughout thinner and softer than normal, and of a dusky red colour. Both ventricles contained clotted blood.

Abdomen.—Stomach large; veins filled with blood; it contained much gas, but only a little pulpy food. No signs of disease were manifest in its coats. The duodenum exhibited

signs of chronic duodenitis; was rather contracted; of a dusky reddish colour internally, with injected vessels. The pancreas was much altered in character, being of a reddish-grey hue and very soft. The pancreatic artery was converted into a calcareous tube. Liver of a light brown colour; in an early stage of fatty degeneration; presenting wavy lines in all directions, closely aggregated. The gall-bladder contained some thin bile. Both large and small omentum loaded with fat.

A microscopical examination of the diseased tissue of the heart displayed the destruction of the normal muscular tissue, for though, at some parts of the wall of the left ventricle, the outline of muscular fibres was discernible, their true histological characters were lost; whilst in the disintegrated mass, nothing but granular matter, altered blood, and a few fat globules were discoverable. The microscope further showed that, though fat corpuscles occurred, the lesion of tissue could not be called a fatty degeneration.

There can be no question that the destructive lesion of the heart had been progressing insidiously for a long period. Considering the extensive destruction of muscular tissue in the left ventricle, it is astonishing that the heart should have so long carried on the circulation with sufficient force to maintain life. The softening of the wall was such that the very act of contracting upon its fluid contents seemed scarcely possible without rupture; in fact, it did at last tear, but it is remarkable that it did not tear before, and particularly during the exercise the patient was habitually taking. The irregular and softened internal surface indicated the breaking down or deliquescence of tissue which must have at once entered into the circulation; a circumstance which we cannot conceive to have occurred without producing some effects, not equal to those of the circulation of pus, but of a parallel character. And yet, there was no very appreciable sign of such effects; the feeling of powerlessness is attributable to the weak heart, and the thirst and dyspeptic symptoms to the chronic duodenitis. To this last too was most likely due much of the pain about the chest and between the shoulders; but was any of the thoracic pain due to the lesion in the heart? The dark, grumous blood which had escaped from the left ventricle, did it owe its characters to the effects of morbid matters entering into it from the broken, up muscular tissue? There was no lung disease to interfere with the due aëration of the blood, and no other discoverable cause for the alteration of the arterial blood. Lastly, was not the diseased state of the coronary arteries the principal cause of the atrophy and softening of the tissue of the heart?

SEQUEL OF A CASE OF ACUTE PERICARDITIS WITH EFFUSION
NOT OCCURRING IN CONNECTION WITH RHEUMATISM.

UNDER THE CARE OF DR. BEALE.

The history is given at page 92, vol. II. of the Archives.

Notes made during the last month by MR. HARRISON,

Resident Medical Officer to the Carey Street Dispensary.

The Post Mortem by MR. C. J. WORKMAN,

Assistant House Physician, King's College Hospital.

THIS man, aged 20, was admitted into the hospital in January 1860, and had a severe attack of what might fairly be termed idiopathic pericarditis with effusion. He recovered and left the hospital, but the effusion reappeared about three weeks afterwards, and he again became an in-patient in March. The fluid appeared to be entirely absorbed in the course of a month, although there was still considerable dyspnœa.

In the September following he was admitted a third time. (Vol. II, p. 111.) There was considerable dyspnœa, his lips were blue, and there was much fluid in the abdominal cavity. The abdomen was 37 inches in circumference. The heart's sounds were feeble, but no bruit was audible. The cardiac dulness extended to a point an inch and a half to the right of the median line of the sternum,—upwards, as high as the third costal cartilage. The apex beat in about the natural position.

The right external jugular vein was much distended, and when the finger was placed over it and the contained blood forced downwards, it instantly refilled below the point at which pressure was made.

Crepitation was heard at the lower part of both lungs behind, but was loudest on the left side where there was also some dulness towards the lower part. Occasionally a little blood was expectorated with the frothy mucus.

The conjunctivæ were yellow, and the urine was of high specific gravity and contained bile, but no albumen was detected.

The ascites was somewhat relieved by cupping over the kidneys, purgatives and diuretics, but no great improvement in his general condition occurred. The man remained in the hospital till November 27th, when he was discharged at his own request. Soon afterwards he came under the care of

Mr. Harrison the resident medical officer of the Carey Street Dispensary, who kindly furnished the following notes.

"The following was his condition on December 24th :—He was lying on his back in bed, and seemed to be suffering from much dyspnœa; his cheeks were flushed, lips pale, skin and tongue dry, the latter rather coated. The veins of the neck were large and prominent. The abdomen greatly distended, fluctuation everywhere distinctly perceptible. Dulness on percussion, except at the upper part just above the umbilicus, where there was a tympanic sound over a small extent of surface. Both sides of the chest were resonant on percussion, except over the lower part of the left lung, which yielded a dull sound, and this dulness extended to the region of the heart. Mucous râles were audible in both lungs. He complained much of his cough, and expectorated freely. On examining the heart, no bruit or abnormal sound could be detected, though its action was irregular and sometimes tumultuous. Pulse feeble and irregular, the artery never feeling evenly distended. Urine scanty. Bowels confined. Ordered some linctus for his cough, and to continue the other remedies he was taking, viz.: Pulv. Jalapæ Co. ʒss. occasionally, and the following draught three times a-day: R Potassæ acetat, gr. xx, Sp. Junip. Co. m xi, Sp. Æth. Nit. ʒss., Infus. Quassiae ad. ʒj. M.

Dec. 26.—Dispnoea increasing; complains of great distension of the abdomen; cough easier, and he has rested rather better than usual at night. Urine very scanty, thick, and cloudy, sp. gr. 1·26; contains a large amount of urates, and a small quantity of phosphates; no albumen. To continue the same, with the addition of a grain of calomel to the powder.

Jan. 3.—His distress so great, that Mr. Wood was asked to see him, and the following day performed paracentesis abdominis, and drew off 20 pints of clear greenish yellow fluid. Ordered chloric and nitric ether, with ammonia, and a grain of opium at bed-time.

Examination of Fluid.—Quantity, 20 pints. Clear, bright, greenish-yellow colour. Sp. gr. 1·19. Contains a large amount of albumen, the mass of precipitated albumen half filling the test tube. After standing twenty-four hours, the fluid had separated into a flocculent mass which had gravitated, and a clear supernatant liquid, which retained the greenish-yellow tinge.

January 5 to 8.—Very comfortable; had slept better, and his cough and dyspnœa much relieved. The suffusion of the

countenance had disappeared, the veins of the neck were far less prominent, and his pulse was more regular and somewhat stronger, though still retaining its peculiarity. He expressed himself much relieved, but complained of a few slight abdominal pains, which were dissipated by a mustard poultice. Breathing and cough much easier. The stethoscope reveals only a few mucous râles. The dulness on the left side remains. To take ammonia, nitric ether, and compound spirits of juniper, with paregoric.

January 9.—Continues better, makes rather more water, which contains no trace of albumen. Bowels regular. The fluid is accumulating again rather rapidly. Has been sitting up for a short time to-day, but finds when he does so that his feet and legs become œdematous.

January 21.—Cough becoming distressing again, and there is a return of mucous râles. Distension of abdomen rapidly increasing. Makes less water than he did.

January 25.—Dyspnœa and cough very distressing. Forehead covered with a cold clammy sweat. Countenance suffused, and conjunctivæ slightly injected. Pulse very feeble and irregular.

January 28.—Distress so great, that Mr. Harrison asked Mr. Wood to see him, who thought it advisable to repeat the operation of paracentesis, which he did, and took away twelve pints of fluid, which proved to be chemically and physically the same as the last. It was necessary to stimulate him frequently with brandy, and he was ordered to continue it occasionally.

January 29 and 30.—Declares himself easier, and slept more comfortably. Pulse very feeble. Appetite bad.

January 31.—The first part of the morning he seemed better and was quite cheerful, but about 10.30 he began to complain of pains in his head and right side over his liver, and shortly afterwards fell into a deep sleep. When he was visited, he was lying on his back, breathing heavily, his lips livid and face flushed. He was with difficulty roused, and then partially, and immediately he would fall again into a deep sleep. Pulse scarcely perceptible. Ordered brandy and chloric ether, ammonia, and tinct. serpentar.

He died a few hours afterwards. He was conscious, and recognized those about him before he died.

Post Mortem, February 2, conducted by Mr. C. J. Workman, who made the following notes:—"Body rather emaciated. When the abdomen was opened, its cavity was found to contain several pints of fluid, with some loose flakes of lymph;

there were no marks of inflammation about the site of the tapping.

The upper part of the anterior wall of the peritoneum, extending from the lower margin of the ribs to the umbilicus, presented a mottled black appearance, resembling ecchymosis. The anterior wall of the thorax having been removed, and the pericardium opened, the latter was found much thickened, it was not adherent anteriorly, but slightly so along the left edge and apex, and also along the whole base. It contained no fluid, but some flakes of soft lymph at its lower part.

The Heart measured, in circumference, round the base of the ventricles, and following their outlines, 11 inches. The length of the whole heart was $6\frac{1}{2}$ inches. The transverse diameter, at the junction of the auricles with the ventricles was $4\frac{3}{4}$ inches. All the cavities were dilated. The left ventricle was about $\frac{3}{4}$ inch thick at the apex, about $\frac{3}{8}$ inch thick higher up. The aortic valves were healthy.

The *aortic orifice* measured $2\frac{7}{8}$ inches in circumference; the commencement of the aorta $2\frac{1}{8}$ inches.

The *mitral valve* admitted two fingers, the posterior valve was rather thickened and contracted; the anterior lip was healthy.

The *right auriculo-ventricular opening* barely admitted two fingers.

One lip of the tricuspid valve was healthy, the other two lips seemed so contracted and entangled that it was impossible to define them.

The *pulmonary valves* were healthy.

There were old firm adhesions of the pleura everywhere, on both sides. The lower part of the lower lobe of the left lung was carnified, and the pleura over it much thickened. The rest of the lungs was congested, and contained no trace of tubercle.

Liver.—The omentum was adherent along its anterior edge, concealing the stomach as if it had been pushed upwards by the peritoneal fluid. The liver was adherent behind to the diaphragm, it was of normal size, its structure was congested and soft.

Spleen appeared to be pushed upwards, it was nearly three times its natural colour, and greatly congested.

Both kidneys were also much congested, but otherwise appeared healthy."

ON
TAKING CASES,
AND
MAKING POST MORTEM EXAMINATIONS,

BY LIONEL S. BEALE, M.B., F.R.S.

SUGGESTIONS FOR TAKING CASES.

THE following suggestions are published in the hope that they may be practically useful to those engaged in clinical observation, especially in the wards of a hospital. The matter has been condensed into the smallest space consistent with clearness, and reference has only been made to the most important points which should engage attention. It is obvious that such a scheme must be very defective in many ways, but it is hoped that it may help to diminish the difficulties of reporting cases, and remind the reporter of some of the principal points to be inquired into, while he is actually at the patient's bed-side.

The order I have adopted is the one followed in my own case books, but it may easily be modified, if thought desirable. Throughout, I have endeavoured to make the arrangement simple, and to place the subject of inquiry in order. It will be found, however, that I have sacrificed theoretical classification to practical convenience. Some apology is due for the insertion of a paper on elementary work of this kind in the "Archives," but I have been so frequently asked to arrange a scheme of the kind that I could not but make the attempt. I have added short notes on the terms generally employed in reporting cases, and a condensed report on the chemical and microscopical examination of the secretions.

It is not necessary for the Clinical Observer to note all the points alluded to in the following sections, but he will select those which he considers necessary in the particular case under examination.

The questions to the patient should be simple and precise. The facts ascertained should be expressed in as few words as possible, consistent with perfect clearness. No indefinite terms should be employed. The patient should always be made to place his hand over the part which he considers as the seat of his malady.

Long descriptions of the precise seat of the affection may often be avoided, by the use of the blank forms described in vol. ii, p. 97—the organs supposed to be altered being indicated by shading.

It is desirable to adhere to the order recommended, as far as practicable.

The case book may be large (8 inches $\times$ 13) or small (6 inches $\times$ 8), but in all cases a margin of at least an inch and a half should be left on the left side of the page, and it is better to write on one side only.

I. TO BE NOTED IN EVERY CASE.

Date and Time of the observation.

Name, Age, Address, Sex, Married or Single, Children, Date of birth of last child, Occupation.

Locality, Drainage, Water, Smells, &c.

Height, Weight,* General Nutrition, Muscularity.

Quantity and Nature of Food, Amount and Kind of Stimulants taken, Well or Badly Clothed.

II. PRELIMINARY ENQUIRIES.

What is the Matter? Where does the Patient Suffer ?†

General Health, Previous Illnesses, How Treated.

Was the patient well immediately before the present attack (*acute affection*) or had he been ailing for some time previously (*chronic affection*)?

Description of present Attack.

III. FACTS ELICITED BY GENERAL OBSERVATION.

Face, Complexion, Expression, Colour, Puffiness, State of Eyes, Pupils, Lips. **Voice and Speech:** thick, hoarse, difficulty of articulation, cough. **Mouth:** teeth, throat, &c. **Manner:** intelligent, excited, dull, drowsy. Posture, in and out of bed. **Surface generally:** cold, hot, dry, moist. Alterations of colour or texture. Eruptions. **Limbs:** peculiarities of form. Staggering gait. Spasmodic, twitching, or jerking movements. **Swelling:** local or general. Fluid or air in areolar tissue, in viscera, or cavities; circumscribed collections of fluid. Thickening. New growths, &c., painful or not.

* Excellent weighing machines may be obtained for £3 15s., of Messrs. Pooley, Fleet Street, London.

† These questions will sometimes enable the observer to ascertain the nature of the case at once. He will not write down the answers he receives, but the nature of his subsequent enquiries will be much influenced by the reply to these questions.

IV. POINTS TO BE DISCOVERED BY A MORE EXTENDED EXAMINATION.

Pain, Uneasiness, or Discomfort : local or general, its precise situation and character.

Pain produced by pressure or by certain movements.

Nausea, Vomiting, Rigors.

State of Intellect and Nervous System, Memory, Giddiness, Headache, Restlessness, Delirium, Impaired or Lost Sensation, Paralysis, Convulsions. Sensations of cold or heat, tingling, numbness, &c.; alterations in **Sight, Hearing, Smell, Taste, Touch.**

Appetite. Thirst. State of Tongue. Discomfort after Food.

Pulse, Respiration : their frequency and character.

Examination by Measurement,* Percussion, Palpation, Auscultation of Thorax, Lungs, cavities of Pleura and Pericardium, Heart and large vessels ; Abdomen, Liver, Stomach, Spleen, Colon, Bladder, &c. Alterations in form or movements of these cavities.

Secretions and Discharges : general characters. Results of **Microscopical and Chemical** examination.

The blood.

Surface generally : sweat, sebaceous matter, cuticle.

Eyes : state of conjunctiva, canaliculi.

Nose : odour of breath, character of discharges.

Ears : secretion in external meatus.

Mouth : saliva, fur from the tongue, sputum, vomit.

Bowels : frequency and nature of discharge ; quantity.

* Most measurements may be made accurately with an ordinary tape, marked with inches divided into eighths or tenths. In order to be sure that the tape is applied in the same spot, when measurements are made subsequently, spots may be made on the skin with nitrate of silver, ink, chalk, or various colouring matters, or by applying small pieces of black sticking plaster. These spots may also be marked on the plans of the figure, described in vol. ii, page 97, plates VII and VIII.

The respiratory movements may be measured with the stethometer of Dr. Quain, and the chest measurer of Dr. Sibson. Alterations in the inclination of different parts of the surface of the chest to each other, are to be ascertained by the instrument invented by Dr. Scott Alison (*Archives of Medicine*, vol. i, page 60).

Urine : frequency of micturition ; accompanied with pain or not ; general characters of the urine ; quantity passed in twenty-four hours ; specific gravity ; microscopical and chemical examination ; state of urethra, bladder, kidneys.

Catamenia : state of vagina, character and frequency of discharge. Leuchorrhœa.

Diagnosis :

Objects to be attained by treatment.

Treatment recommended : *the medicines ordered should be written in Latin, and the proportions denoted by the usual signs, but the directions should be given in English.*

All directions as to diet and treatment should be underscored.

The course of the case should be noted at regular periods. In many cases *every day or every other day* will be sufficient, but in cases of *acute disease*, notes should be made at *shorter intervals (3 to 12 hours)* according to the symptoms.

The frequency of the pulse and respiration, and the state of the principal secretions should be noticed day by day in acute cases.

PRINCIPAL TERMS USED IN REPORTING THE RESULTS OF PERCUSSION AND AUSCULTATION OF THE CAVITIES OF THE CHEST AND ABDOMEN.

By Palpation, Percussion, and Auscultation, alterations in the position, form, texture, and consistence of the viscera contained in the cavities of the chest and abdomen are ascertained.

PALPATION.

This word comes from the French *palper*, to feel. It means exploring by touch or feeling, or by applying pressure. The tips of one or more fingers may be employed, or the whole hand, according to the size of the space to be felt.

By palpation we are enabled to judge of the size, form, and consistence of tumors, which are not too deeply situated to be felt ; the existence of fluid in certain cavities of the body. Pressure and movement of parts often cause pain, and thus we learn if sensation is diminished or exalted.

PERCUSSION.

In percussion, one or more fingers of the left hand are placed in contact with the skin, and as flat as possible over the region to be percussed, and the dorsal surface of one finger is to be struck sharply with the tip of the middle finger, or with the tips of two or three fingers of the right hand, the movement of the hand being produced at the wrist and not at the elbow joint. The exact spot over which a certain sound is elicited may be marked as described in the note on page 49.

Clear or resonant, as the sound produced by percussing those parts of the thorax which are situated over healthy lung.

Tympanitic or drum-like. The sound elicited by percussing the abdomen when the viscera contain air,—the thorax, when there is a large superficial cavity in the lung just beneath the surface, when the lobules of the lung are permanently dilated so as to form large simple sacs, as in *pulmonary emphysema*, or when the pleural cavity contains air (*pneumo-thorax*).

The cracked-pot sound occurs in some cases when sharp percussion is made over a cavity which is empty or contains only a little fluid, and communicates freely with the bronchial tubes. The patient should be made to open his mouth at the moment of percussion. This sound is not of very common occurrence.

Dull. The sound produced on percussing solid substances, somewhat modified according as it is produced by percussing over a thick layer of *fluid*, over *solid organs* as the liver, the thick muscular substance of the limbs or the bones.

All these sounds vary much in *intensity*, and considerably in *character*. The intensity of the dullness can be indicated in the plans by the darkness of the shading.

AUSCULTATION. THE LUNGS.

The ear may be simply applied to the walls of the chest covered with one thickness of linen; but for auscultation under the clavicles, and in some other parts of the chest, a stethoscope is not only desirable but necessary. By the latter instrument also, sounds occurring in circumscribed spaces are isolated, and to some extent separated from those occurring in the immediate neighbourhood.

1. Sounds produced by air passing to and from the air-cells of the lung.

Dry { Vesicular breathing or *normal respiratory murmur* heard in health.
Puerile respiration, when the respiratory murmur is more intense than in health.
Feeble respiration, when the respiratory murmur is only slightly audible.
Prolonged inspiration or *expiration*, when the duration of the inspiratory or expiratory murmur is increased.
Rough, harsh, or coarse breathing, when the respiratory murmur is rougher than in health. When this modified respiratory murmur is

heard over a very small space, it indicates that a change has taken place in the character of the walls of some of the air-cells.

Moist { **Fine crepitation.** A fine crackling sound produced by the passage of small bubbles of air to or from the air-cells, through viscid fluid, or in consequence of the air-cells being diminished in size and their walls thickened from the pouring out of exudation.

2. Sounds produced by the air passing to or fro in air-tubes, or in cavities.

Rhonchus. A harsh, rough, or snoring sound, caused by the passage of the air along the larger bronchial tubes, when the mucous membrane is swollen or covered with viscid mucus, or when the calibre of the tube is diminished from any cause.

Sibilus. A hissing or whistling sound produced in the smaller bronchial tubes, under the same circumstances which give rise to rhonchus in the larger ones.

Dry { **Bronchial breathing.** A sound resembling that heard on listening over the trachea during respiration. When heard over a part of the chest, normally occupied by healthy lung, it may result from the air-cells of the lung being rendered solid by the accumulation of lymph and serum, tubercle, cancer, &c., and thus rendered a better conductor of the sound which is produced by the air as it passes along the larger bronchial tubes. This sound is often heard in pneumonia, tubercle, or cancer, but it may depend upon the pulmonary tissue being somewhat compressed and forced close to the parietes of the chest, as from the accumulation of fluid in the pleural cavity.

Cavernous breathing. A loud, harsh sound, produced by air rushing through a tube or dry cavity.

Amphoric breathing. The sound produced when air passes to or from a narrow orifice into a large cavity containing air.

Large Crepitation. Large or coarse crepitation, *Mucous râles.* Moist sounds, produced by bubbles of air passing through tenacious mucus or a viscid secretion in the larger bronchial tubes, or in small cavities.

Moist { **Gurgling.** A sound produced by the passage of successive bubbles of air through fluid contained in a tube or in a cavity.

Metallic tinkling. Probably caused by the sudden escape of a small bubble of air through fluid, or through a narrow opening into a cavity. It may be produced by moving the patient slightly, in a case where fluid and air exist in the pleural cavity.

3. Modified voice sounds.

Bronchophony. The voice sound modified by resounding in a tube or small cavity just beneath the walls of the chest, or separated from the surface by solid lung, resembling the sound heard by placing the ear a little below one or other sterno-clavicular articulation of a healthy person while speaking.

Pectoriloquy. Voice sounds modified by resounding in a large tube or cavity of considerable size, resembling the sound heard by placing the stethoscope over the larynx of a healthy person when speaking.

Egophony. A curious trembling, twangling sound, something like the bleating of a goat, generally produced by the voice sounds passing over the surface, or through a thin layer, of liquid in the pleural cavity.

Cough. When the patient is made to cough, many of the respiratory sounds are greatly increased in intensity, and during the long drawn, forcible inspiration which succeeds, crepitation may be produced, which does not occur in ordinary breathing.

4. Friction sounds, produced by the rubbing together of two rough surfaces.

Pleuritic rubbing. This may accompany inspiration and expiration, but when slight may be audible only at the end of a forced inspiration. It is described as a creaking, grating sound. It may have a dry or moist character.

To and fro rubbing or friction sound, heard over the region of the heart in pericarditis, caused by the rubbing together of the layers of the pericardium, upon which lymph has been effused.

The grating thus produced, which is audible by the ear, may often be felt by the hand in pleurisy and in pericarditis. In peritonitis, if the abdominal walls be moved a little with the fingers applied flat to the surface a peculiar rubbing is felt.

AUSCULTATION. THE HEART.

The heart may be examined by percussion and auscultation. The sounds produced by its action may be listened to in front, at the side, or at the back of the chest.

Position of the heart determined by percussion.

Impulse of the heart increased or diminished.

Rythm. Note any alterations in the duration of the sounds, or interval. *Irregular or intermittent* heart's action. Any alterations in the character or intensity of the first or second sounds should be noticed. They may be clear, or dull, or muffled.

Murmurs, bruits or bellows' sounds, sawing, blowing, musical, cooing. A bruit heard most distinctly at the base of the heart, may be situated in the *aorta* or *pulmonary artery*, and may take the place of the first or second sound of the heart. Bruits are caused by narrowing of orifices, or by some deficiency of the valves which guard them. In the case of the aorta and pulmonary artery, a *systolic bruit* is produced by a narrowing of the orifice, a *diastolic bruit* arises from a defect in the closure of the valves.

A systolic bruit is often heard over the aorta, and in the course of the large arteries in cases of anæmia, where there is no change whatever, either in the orifices or in the valves.

Venous murmur. In similar cases, a continuous humming or purring sound is often heard by placing the stethoscope *lightly* over the large veins at the base of the neck.

A *bruit*, heard most distinctly at the apex of the heart, generally depends upon a defect in the closure of the mitral valve. It is *systolic* and *regurgitant*, depending upon the blood flowing from the ventricle back again into the auricle during the systole.

CHEMICAL AND MICROSCOPICAL EXAMINATION OF SECRECTIONS.

CHEMICAL APPARATUS AND RE-AGENTS-

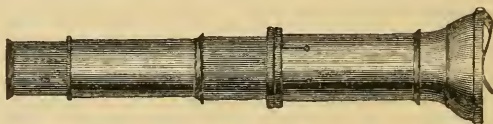
Nitric Acid.	Nitrate of Barytes.
Sulphuric Acid.	Phosphate of Soda.
Acetic Acid.	Oxalate of Ammonia.
Solution of Potash.	Iodine Solutions.
Solution of Soda.	Sulphate of Magnesia.
Ammonia.	Tincture of Galls.
Solution of Chromic Acid.	Alcohol.
Nitrate of Silver.	Ether.

Sulphate of Copper.

Apparatus.—*Glass Slides, Thin Glass, Pipettes, Conical Glasses, Spirit Lamp, Small Retort Stand, Test Tubes, Stirring Rods, Filters and Filtering Paper, Beakers, Evaporating Basins, Small Water Bath, Urinometer, Blue Litmus Paper, Red Litmus Paper.*

The tests may be kept in bottles or in tubes with capillary orifices.

MICROSCOPE AND INSTRUMENTS.



CLINICAL MICROSCOPE.

Clinical pocket microscope.* The powers required are the quarter, magnifying about 200 diameters, and the inch, magnifying about 40 diameters. Needles mounted in handles. Scissors, forceps, animalcule cage for examining urinary deposits, &c., glass slides, thin glass.

Glycerine for preserving specimens. When a specimen is to be preserved in glycerine, it is to be immersed in the fluid for some hours before it is mounted permanently.

MICROSCOPICAL EXAMINATION.

* * * References are given to "The Microscope in its application to Practical Medicine," second edition.

In the microscopical examination of the various secretions and discharges, the observer must constantly bear in mind that various extraneous matters are likely to be present. It is also necessary to be aware that cases of imposition are of very frequent occurrence. The observer should make himself familiar with the microscopical characters of the ordinary articles of food, and the deposits from drinks, as soon as possible, or he will be liable to make the most ludicrous mistakes. *Mic. in Med.*, p. 297.

Sebaceous matter. Oil globules, granular matter, fragments of hair, sometimes crystals of cholesterine. In that from the follicles of the

* The instrument is made by Mr. Matthews, opposite King's College Hospital, and Mr. Highley 70, Dean Street, W.

nose, ears, and scalp, the *entozoa folliculorum* are found. These entozoa are very common, and are found in the upper as well as in the lower classes. They are examined after the addition of a drop of oil or glycerine.

Cuticle. *Epithelial scales* as modified in skin diseases. *Fungi* are present in various diseases. To be demonstrated by soaking cuticle in glycerine, and examining with a power of 400 diameters or higher. *Mic. in Med.*, p. 245, 369.

Contents of vesicles, pustules.

Conjunctiva. Tears. *Epithelium*, form.

Nose. *Mic. in Med.*, p. 253. *Mucus from Nose*, p. 274. *Epithelium*. Squamous, ciliated, black particles of carbon. *Pus corpuscles*.

Ears. Oil globules, fragments of hair, granular matter. *Entozoa folliculorum* in wax. *Fungus* rarely observed. *Mic. in Med.*, p. 373.

Mouth. *Saliva.* *Salivary corpuscles.* *Epithelium* from mouth often invaded by fungi. *Mic. in Med.*, p. 265. Fur from the tongue usually consists of epithelium and the debris of old epithelial particles, oil globules, and various insoluble constituents of the food, granular matter, and minute fungi.

False Membranes on back of tongue and pharynx. *Mic. in Med.* p. 278, 281.

Sputum. Small pieces should be taken from different parts of the sputum, and subjected to examination separately. It is only necessary to place a piece about the size of a pin's head on the glass slide, and cover it with thin glass, pressing it until sufficiently thin to be transparent. If it is necessary to moisten it, it is better to use weak glycerine than pure water.

Mucus contains small and large granular cells, large spherical masses containing particles of carbon, and occasionally cells of columnar epithelium from the bronchial tubes.

In catarrh, the granular cells are more numerous and more closely resemble pus corpuscles. In the opaque yellow sputum of chronic bronchitis, pus is very abundant.

The viscid rusty sputum of pneumonia contains numerous small granular corpuscles, the cells found in ordinary mucus, blood corpuscles, and often much fine granular matter.

In phthisis, pus is often present in considerable quantity. Occasionally tubercle corpuscles may be observed, and sometimes small fragments of pulmonary tissue. The latter prove that softening is taking place, and the pulmonary tissue disintegrating. Care must be taken not to mistake the fibrillation of mucus for the elastic fibres of pulmonary tissue. *Mic. in Med.*, p. 277. Besides these structures, mucus cells, much granular matter and oil globules.

Vegetable structures are often present in sputum. *Mic. in Med.*, p. 281.

Fibrinous casts, masses of calcareous matter, portions of hydated cysts, and fragments of echinococci, are met with in rare cases.

In all sputum the observer will meet with fragments of the epithelial covering of the mouth and tongue, and various substances taken in the food, oil globules, starch granules, fragments of muscular fibre, and

numerous other bodies, with the microscopical characters of which he must make himself familiar. *Mic. in Med.*, pp. 297, 180, &c.

Vomit. *Epithelium* from the tongue, mouth, œsophagus, or stomach, may be present. Small fragments of various articles of food are constantly found. Very often large oil globules, in which the stearine has crystallized, are met with. *Blood corpuscles*. Various forms of *fungi*. *Sarcinæ*.

The superficial layers of the epithelial covering of the œsophagus are sometimes expelled in the form of a tube, and large flakes of the epithelium of the stomach have been rejected. *Mic. in Med.*, p. 283.

Discharges from the bowels. *Epithelium* from the large intestine, with flakes of mucus. Sometimes large flakes of the epithelium are passed entire. Blood corpuscles, when present, are often very much altered. In cholera, the epithelium from the small intestine, and complete sheaths of villi and casts of the follicles have been found, but are not constantly present. Fungi of various forms are occasionally found. Numerous substances derived from the various articles of food which have escaped the process of digestion. Pieces of yellow elastic tissue from the arteries or from the ligamentum nuchæ, are often found, and have been mistaken for entozoa. *Mic. in Med.*, p. 284.

Discharges from the uterus or vagina. Menstrual fluid contains blood corpuscles, many of which are ragged and much altered, and epithelium from the uterus and vagina. Casts of the epithelial covering of the vagina are sometimes passed entire. *Mic. in Med.*, p. 286.

Leucorrhœal discharge usually contains pus, modified epithelium from the vagina, and the usual large epithelial scales. *Mic. in Med.*, p. 308. The trichomonas vaginæ has been found by some observers. *Mic. in Med.* p. 308.

Cancer cells are sometimes found in cases of cancer of the uterus or bladder. *Mic. in Med.* p. 286.

URINE.

* * The references are to the Author's work on "*Urine, Urinary Deposits, and Calculi*."

For instituting a rough general examination of a specimen of **Urine**. The most necessary tests may be arranged under six heads; and, by having recourse to one or more of these, we are enabled to determine roughly the most common morbid states of the urine.

1. *Reaction* (pp. 12, 82, 83).

2. *Specific Gravity* (pp. 8, 10, 81). When very high, we may suspect an increased quantity of urea (excess); the presence of sugar. Apply tests mentioned below. Hysterical urine, and urine of cases where much water has been taken, is of very low specific gravity.

3. *Heat*. Urate of ammonia, distinguished from pus or phosphate (p. 275). Albumen. Precipitation of phosphate, etc. (p. 134).

4. *Nitric Acid* dissolves phosphates (p. 134); decomposes urate of ammonia (if strong, rapidly); precipitates albumen in urine, even when in very small quantity, and due to the presence of pus. Used also to test the presence of uric acid. Excess of urea. Bile (p. 144).

5. *Potash* (274). Urates are soluble in potash, and are thus distinguished from pus or phosphate. Uric acid from blood corpuscles. Sugar indicated by a brown colour, after prolonged boiling.

6. *Nitrate of Silver* (p. 59). Precipitate of chloride of silver, insoluble in nitric acid. In certain cases of extensive inflammation, as in pneumonia, pleurisy, and some others, the urine does not contain a trace of chloride of sodium (p. 108).

1. Chemical examination with reference to detecting the nature of the deposit.

a. *Light and flocculent deposits*. Deposits of this class are generally too light, and the quantity is too small for the application of chemical tests. See *microscopical examination* of deposits, below.

b. *Dense and opaque deposits*, usually present in considerable quantity, are of three kinds, which much resemble each other in appearance.

1. *Urate of Soda* (p. 274). Lateritious, nut-brown sediment. Varies much in colour. Urine acid. *Tests*. Soluble by heat, in potash, ammonia, water. Decomposed by acid; uric acid set free.

2. *Phosphates* (p. 283) Urine usually alkaline or neutral. When triple, phosphate alone is present, the urine is sometimes feebly acid. *Tests*. Insoluble by heat or in alkalis; soluble in acids, and afterwards precipitated by ammonia.

3. *Pus* (p. 278). Diffused through the urine, rendering it turbid, or forming a bulky creamy deposit, with clear or turbid supernatant fluid. *Tests*. Rendered glairy by potash. Albumen in urine precipitated by heat and by nitric acid. *Caution*. Albumen may be independent of the pus.

c. *Crystalline or granular deposits are usually in small quantity, forming a sediment which may either be coloured or transparent and colourless*.

1. *Uric acid* (p. 291). Colour characteristic, usually of a dark mahogany brown, sometimes paler, very seldom quite colourless. Large separate clusters of crystals. It rarely forms a granular deposit. *Tests* (p. 295). Soluble in potash, nitric acid. After evaporation with nitric acid, ammonia gives the dark violet colour of murexide or purpurate of ammonia. Often mixed with blood, smoky urine. Albumen detected in the fluid. 2. *Blood corpuscles* (p. 313). See *microscopical examination*. 3. *Oxalate of lime* (p. 297). Seldom in sufficient quantity to form a deposit visible to the unaided eye. See *microscopical characters*. *Tests for oxalate of lime calculi*. Insoluble in water, potash, and acetic acid, even when boiled; soluble in mineral acids; and again thrown down amorphous, but unchanged in composition, by ammonia. By incineration, an odour like that of burnt feathers is evolved. Black ash becomes white by decarbonization; this ash is soluble in acetic acid, with copious effervescence. Oxalate of ammonia added to acetic acid solution precipitates oxalate of lime.

4. *Silica* (p. 313) is said to have been found in very minute quantities in urine; rarely met with as a deposit, except in the form of grains of sand in the urine of hysterical patients and impostors. Easily known by its great density, general appearance, and insolubility in strong mineral acids.

2. Chemical Examination with reference to the Discovery of an Abnormal Condition of the Soluble Constituents of the Urine, or of the Existence of Substances of a Soluble Form not met with in Health.

1. *Albumen* (p. 131). Urine pale; often of very low specific gravity, 1005 to 1012 or 1014. Heat or nitric acid, if urine be acid; nitric acid, if the urine be alkaline. Reason: solubility of albumen in alkalies. *Fallacies.* A trace of nitric acid prevents the precipitation of albumen by heat (p. 134). Precipitation of phosphates by simply boiling the urine. Precipitation of minute crystals of uric acid upon the addition of dilute nitric acid to some specimens of urine: hence necessity for employing both tests (p. 134).

2. *Excess of Urea* (p. 89). Urine frequently high coloured; specific gravity, 1030 to 1040. Upon the addition of an equal volume of strong nitric acid, crystals occur within half an hour, if there be much excess. Oxalic acid is often employed when the urea is to be determined quantitatively.

3. *Sugar* (p. 148). Urine pale, of high specific gravity, from 1030 to 1050. Trommer's test (p. 151). Potash tests (p. 151). Fermentation test (p. 160). Tartrate of copper (p. 152).

4. *Sulphates* (pp. 56, 113). Nitrate of barytes or chloride of barium, after the addition of a few drops of nitric acid.

5. *Chloride of Sodium* (pp. 59, 108). Nitrate of silver, after the addition of a few drops of nitric acid.

6. *Bile* (p. 144). Urine of a dark yellow colour. Nitric acid; play of colours. Pettenkofer's test.

Microscopical Examination of Urinary Deposits.

Great caution required in every step (p. 212). A large quantity of urine (at least four ounces) should be allowed to subside in a *conical glass* (Figs. 87, 90) for some (two or three) hours, or the greater portion of the urine may be poured off from the deposit, which may then be submitted to examination. In this case, small bottles only need be taken to collect specimens; but, of course, no idea can be formed as to the relative amount of deposit present (p. 212). When the insoluble matter has subsided, the deposit may assume one of three characters.

1. It may occupy a large bulk, and present a flocculent appearance; or

2. It may form a dense, opaque, abundant or scanty stratum; or

3. The deposit may be small in quantity, crystalline, consisting of sparkling colourless points, or of granules more or less coloured.

All these characters may co-exist in one deposit, in which case we observe three distinct strata, each of which must be *separately* submitted to microscopical examination. In most cases, there are two distinct strata.

1. *Substances floating on the surface of the Urine, or diffused through it, but not forming a visible Deposit.*

a. Opalescence produced by urates (p. 233).

b. Opalescence produced by vibriones (p. 233).

c. Milk in urine (p. 234).

d. Chylous urine (p. 234).

2. *Deposit light and flocculent, occupying a considerable Bulk.*

Always take specimens from the bottom of the glass for examination, as well as from the bulk of the deposit.

a. *Simple mucus-corpuscles* (p. 253), or with bladder or renal epithelium (p. 259). Cells sometimes tinged with yellow bile.

b. *Simple mucus, or epithelium*, with numerous small crystals of oxalate of lime entangled in it (p. 597).

c. *Casts*. Various forms of casts (p. 263). α. Casts of medium diameter. β. Casts of considerable diameter. γ. Casts of small diameter.

d. *Vibrio*nes (p. 256). *Torulæ* (p. 257). *Spermatozoa* (p. 260). *Sarcinæ* (p. 258).

e. Matters of extraneous origin (p. 225). Bed-flock : hair : feathers : dust. Distinction from casts, etc. (p. 229).

3. *Deposit dense, opaque, and abundant.*

a. *Urates*. Amorphous deposit soluble by heat.

b. *Pus* (p. 278). Characters. Rendered glairy by potash. Action of acetic acid on the pus corpuscles as shown in microscopical examination.

c. *Phosphates* (p. 283). Phosphate of lime (amorphous) (p. 284). Triple or ammoniaco-magnesian phosphate (crystalline) (p. 283). Mixed with carbonate or oxalate of lime.

d. *Sand*. Starch (p. 229) Potato : rice : bread-crumbs : arrowroot.

4. *Granular or crystalline Deposits, small in quantity, sinking to the bottom, or adhering to the sides of the vessel.*

a. *Uric acid* (p. 293). Forms of. Amorphous. Varies much in colour. Polarisation.

b. *Oxalate of lime* (p. 297). Forms of. Dumb-bells. Distinction of oxalate of lime from triple phosphate.

c. *Phosphate of lime* (p. 284). Triple phosphate, radiating crystals p. 283).

d. *Blood-globules* (p. 313).

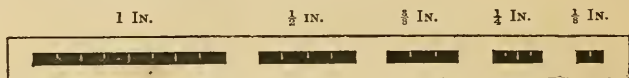
e. *Cystine* (p. 176). *Carbonate of lime* (p. 312).

SUGGESTIONS FOR MAKING AND RECORDING POST-MORTEM EXAMINATIONS.

THE different organs may be examined in any order, and in many cases it is only possible to examine those which are considered to be in a morbid state, but, where time is allowed, the following order is recommended.

Notes should be made at dictation, in a book kept for the purpose, while the body is being examined. The observations should soon afterwards be entered in their proper order, in the **Post Mortem Book**, and the results of the more minute microscopical and chemical examinations which may be necessary, added. The **Rough Notes** taken at the time should always be carefully preserved.

Loose comparisons as to form, dimensions, bulk, colour, weight, specific gravity, consistence, &c., should never be permitted. Form and colour should be indicated by sketches with coloured chalk. Size in eighths or tenths of an English inch.



I. TO BE NOTED BEFORE COMMENCING.

Date and Time of Examination. *Weather, Temperature.*

Name, Age, or apparent Age. *Sex.*

Date of Death of Patient. **Reference to Case Book.**

Measurement of Body. *Height, Weight, Nutrition.*

Cadaveric Rigidity. *Putrefaction, Temperature of Body.*

External Appearances. Expression of countenance, Peculiarities and Colour of Hair, Colour of surface generally. *Oedema, Emphysema.*

II. EXAMINATION OF HEAD AND SPINE.

The head is to be opened as follows:—An incision is to be made through the integuments of the scalp, down to the bone, from ear to ear. The flaps are to be drawn *forwards* over the face, and *backwards* over the neck. The saw is to be carefully carried round the head, an inch above the eyebrows in front, and through the occiput behind.*

* The best saw for the purpose is a bow saw. A chisel-shaped instrument, of a T shape, is most convenient for wrenching off the calvarium, when sawn through. A very thin long knife is required for removing the brain in slices. A tin can with a spout, having an orifice of rather less than a quarter of an inch in diameter, is the most convenient vessel for pouring a stream of water upon the brain, to ascertain its consistency.

Integuments of Cranium, Bones of the Skull, Dura Mater. State of the Sinuses, Pacchionian bodies, Character of **Arachnoid**, Fluid seen upon opening the dura mater, Surface of Brain, Vascularity, Firmness of convolutions, Width of convolutions and of the sulci between.

The brain is to be removed by dividing the nerves at the points where they leave the dura mater. The tentorium cerebelli is to be divided with the point of the knife, and the medulla oblongata, with the vessels, are to be cut across as low down as possible.

Brain. *Weight, General Vascularity, Consistence, Specific Gravity ; its bulk.**

Remove hemispheres by horizontal slices ; notice—

Extravasations of Blood, Dilated Vessels, Tumors, Soft Patches, Cicatrices, Vascularity, Firmness, Moisture of White and Grey Matter.

Lateral Ventricles. *Quantity of Fluid in them, Lining Membrane, Choroid Plexuses, Velum Interpositum, Fornix, &c.*

The corpora striata and optic thalami are to be removed gradually, in thin slices cut vertically, inclining outwards. Each slice should be carefully examined for cicatrices of clots.

Corpora Striata, Pineal Body. Corpora Quadrigemina, Processus e cerebello ad testes.

Pons Varolii, or Mesocephale.

Medulla oblongata. Surface, Section, *Fourth Ventricle. Cerebellum.*

These parts are likewise to be removed by thin slices.

The laminæ of the vertebræ are to be sawn through or cut through with a proper instrument. The nerves are to be divided as they pass through the intervertebral foramina, and the spinal cord may be removed.

Vertebræ, Dura Mater. *Spinal Veins.*

Cerebro-spinal Fluid. *Arachnoid, Pia Mater.*

Spinal Cord. *Weight, Dimensions, Consistence, &c.*

Sections of Cord. Roots of the Nerves.

* The bulk of an organ is ascertained by measuring the exact quantity of water it will displace.

The microscopic examination of the spinal cord is conducted according to the plan recommended by Mr. Lockhart Clarke.—Archives of Medicine, vol. iii, p. 22.

Examination of Eyes, Nose, Ears.

III. EXAMINATION OF THE THORAX, ABDOMEN, AND PELVIS.

An incision is to be made through the integuments, from a point three inches beneath the chin to the pubis. The linea alba being divided, the skin and muscles may be dissected from the thorax, and the abdomen laid open, by forming two longitudinal flaps. There is no necessity for cutting through the abdominal walls transversely. The cartilages of the ribs are to be divided with a strong knife, or with bone forceps, and the sternoclavicular articulation cut through. The front of the sternum may now be removed, care being taken not to injure the large veins or pericardium.

Fluid in Pleura or Pericardium. *Quantity, Adhesions.*

Observe the position and relative size of the viscera, lungs, heart, liver, stomach, spleen, colon, small intestines, &c. Position and general appearance of tumors **in situ**.

Cut through the large vessels at the base of the neck and divide the trachea immediately below the cricoid cartilage, or, when permitted, dissect away the tongue from its attachment to the ramus of the jaw, draw it down, and remove it with the pharynx, œsophagus, larynx, &c. The larynx and pharynx being firmly grasped, the lungs are to be carefully torn away from their attachment to the spine. The large vessels and the œsophagus are to be divided immediately above the diaphragm. Often it will be found most convenient to remove a portion of the diaphragm attached to the pericardium. Lungs, heart, trachea, larynx, and œsophagus are then to be removed.

Lips. Fauces, Uvula, Tonsils, Teeth, Pharynx.

Tongue. Epiglottis, Glottis, Œdema, *Foreign bodies in the Larynx or Trachea.*

Larynx, Trachea.

Trachea and bronchi to be opened by an incision in front. Avoid wounding the œsophagus.

Lungs. *Colour, Consistence, Weight, Density.* Do they sink in water, or does any part of them sink?

Section. *Cavities, Extravasation of Blood, Deposits in pulmonary tissue, cysts, &c.*

Diaphragm.

The heart may now be separated from the lungs, by dividing the root of each close to the lung.

Position of Heart in Thorax. Relations.

Pericardium. External surface, internal surface.

Heart. *Adhesions in Pericardium, Size, Weight, Fat about Heart, Capacity of Ventricles.*

Measure the quantity of fluid they will contain, and ascertain if the valves completely close the orifices, by pouring in water.

Open the right ventricle. By making an incision near the septum, and, by carrying another along the right edge, a V-shaped flap may be formed. Examine the tricuspid valves. Next pass the finger into the infundibulum and pulmonary artery, which is then to be laid open, by carrying the incision onwards between two of the valves. Dissect the pulmonary artery from the aorta.

The left ventricle is to be opened by an incision directed towards the aorta, commencing near the apex of the heart, a little to the left of the septum. The aorta is to be divided between two of the valves and the arch is to be slit open.

Examine auricles and large veins, clots in heart, state of the walls of the cavities, interior of heart, size of *auriculo-ventricular orifice of right side, size of orifice of pulmonary artery, tricuspid valve, semilunar valves of pulmonary artery, auriculo-ventricular opening of left side, aortic orifice, mitral and semilunar valves*, ascertain how many fingers are admitted through the valvular orifices in the heart.

Aorta. *Its diameter*, character of coats, hardness, dilatation, aneurisms.

Coronary Arteries.

Note any points, with reference to the viscera, while they remain in situ. Remove liver with stomach and intestines, spleen, &c. Carefully tear the colon away from its attachments and divide the rectum at its commencement in the sigmoid flexure. In this dissection be careful not to injure the genito-urinary organs.

Œsophagus.

Peritoneum generally.

Mesenteric Glands.

Stomach. *Size, Contents*, Condition of Mucous Membrane, Muscular Coat, Pylorus.

Next the common biliary duct is to be examined. The duodenum may be opened and probes passed into the gall and pancreatic ducts, which may then be traced in their course from the glands to the intestines.

Coats of Gall and Pancreatic Ducts. Mucous Membrane, Gall stones, Pancreatic concretions.

Separate the small intestines from the mesentery, and afterwards slit them up with scissors, close to their mesenteric attachment, in order to avoid dividing Peyer's patches. The mucous surface is to be carefully washed by a gentle stream of water.

Duodenum. *Valvulæ conniventes*, Vascularity, **Brunner's Glands.**

Brunner's glands are situated in the submucous areolar tissue, and must be exposed by inverting the duodenum upon a loaded cork under water, when, the serous and muscular coats having been removed, the glands are observed and may be isolated, by dissecting away the areolar tissue.

Jejunum, Ileum. *Valvulæ conniventes*, Vascularity, *Peyer's patches.*

Cæcum. *Ileocæcal valve, Appendix Vermiformis.*

Colon. Condition of Muscular Coat, *Solitary Glands.*

Rectum. *Hæmorrhoids.*

Liver. Adhesions, *Bulk, Weight, Density, Hardness, Colour, Capsule, Portal Canals.*

Structure of Substance of the Organ. *Congestion of Portal or Hepatic Veins.*

A thin section of the liver should be placed upon a piece of glass and held up to the light, when the minute branches of the portal vein may be seen at the circumference of the lobules and the little twig of the hepatic vein in the centre. This is often divided in making the section.

Gall Bladder.

Bile. Colour, Re-action, Density, Microscopical characters.

Spleen. *Size, Weight, Colour, Consistence.*

Pancreas.

The kidneys, with the ureters, bladder, and lower part of the rectum should be removed together. In the male the testicles and penis can be taken out at the same time. In the female the ovaries, uterus, and Fallopian tubes may be removed with the kidneys and bladder, and each organ examined separately.

Kidneys. *Capsule, Surface when capsule removed, Size, Weight, Cortical structure, Medulla, Pelvis of Kidney, Ureter.*

Bladder. Contents of Bladder.

Male. *Urethra, Penis, Prostate, Testicles.*

Female. *Urethra, Vagina, Hymen, Uterus, Ovaries, Breasts.*

Large Arteries and Veins of the Abdomen. *Coats, Coagula.*

Ganglia and Plexuses of Sympathetic.

IV. EXAMINATION OF THE LIMBS.

Size, Form, Muscles, Nerves, Joints, Bones.

Appearances resulting from Post Mortem Change.

The walls of the large vessels and other structures are often stained, from mere contact with the blood. This post mortem change must not be mistaken for inflammation or congestion occurring during life. In congestion the distended capillaries can always be distinguished by the use of a lens. There are also many changes in texture, resulting from infiltration of serum; and of colour, depending upon the action of gases set free after death, and upon other causes, which must be carefully noted and not mistaken for the results of diseased processes.

MICROSCOPIC EXAMINATION.

The specimen to be examined must be immersed in fluid. As a general rule, glycerine of various strengths will be found most satisfactory. The tendency of glycerine to render tissues too transparent may, in great measure, be counteracted by the addition of a little alcohol or chromic acid. Morbid specimens often undergo change more rapidly than healthy tissues. It is therefore of the utmost importance that the examination should be proceeded with as soon as possible.

Thin sections of tissues are easily made with a thin double-edged knife. In making thin sections, the knife must be wetted with water or glycerine.

It will be convenient to keep a few glass slides, with thin glass ready for making rough microscopical examinations, in the post-mortem room. This may be readily effected by using the clinical pocket microscope shown in page 54.

PART II.

ORIGINAL RESEARCHES IN PHYSIOLOGY AND
MORBID ANATOMY.

ON THE HISTOLOGY OF A RECURRING FIBROID TUMOUR.

BY WM. ROBERTS, M.D., Lond.
Physician to the Manchester Royal Infirmary.

PLATE III.

Emma Murray, æt. 38, a domestic servant, was admitted into the Manchester Royal Infirmary, under the care of Mr. Smith, March 25th, 1861.

The patient applied on account of a large tumour, situated in the upper part of the neck, immediately beneath the ramus of the jaw, on the right side.

The tumour was rounded in shape, and smooth on the surface, showing, however, indistinct division into lobes. When first perceived, about ten years ago, it was about the size of a marble, and occupied the site of the right submaxillary gland. It enlarged gradually without pain, or other inconvenience, except that occasioned by its bulk. In the last twelve months its growth had been more rapid, and at the time of the patient's admission the tumour was as large as a child's head. The skin over it was loose, pale at the upper part, and somewhat florid at the lower part. The tumour seemed unattached to the deeper structures. It felt highly elastic, and communicated so deceptive a sense of fluctuation that Mr. Smith, a fortnight before its removal, passed a trocar into its substance; but only a few drops of blood trickled through the canula. The wound healed perfectly in a day or two. None of the lymphatic glands in the neighbourhood were enlarged, and the patient, though spare, was in perfect health.

On the 17th of May, Mr. Smith proceeded to remove the tumour. The operation was performed without other difficulty than that arising from the wounding of a large vein, which

bled profusely, and was secured with considerable trouble. The tumour proved to be wholly detached from the surrounding tissues, and to be devoid of a pedicle. The skin was brought over the formidable chasm where the tumour had lain, by sutures in the usual way, and rapid recovery, without any bad symptoms ensued.

Naked eye appearances of the tumour.—It was as large as the head of a new-born child. A moderately thick capsule of fibro-cellular tissue invested it. This could be peeled off from the surface of the mass as easily as the tunica propria from the kidney. Numerous vessels ramified on its surface. One lobe as large as an apple, and three small ones gave some irregularity to an otherwise spherical outline.

When divided hemispherically the cut surface appeared uniform, of a pale gray colour; and the little blood that oozed from it showed but a scanty vascularity. The track of the trocar was easily followed along a buff-yellow band, that terminated about the centre in a patch of extravasation. Besides this there was no sign of hemorrhage into the tumour, nor of degeneration in any part of it. Its substance was soft, breaking down easily under the nail, and presenting an appearance strongly reminiscent of encephaloid cancer.

On closer examination the surface had a somewhat glandular look. It appeared divided into areas or lobules, about the size of a pea. These lobules were indistinctly insulated, and the exceeding friableness of the texture forbade the idea of a really glandular structure. Perhaps, that a better notion of the appearance of the surface would be conveyed by comparing it to that of a sore covered with pale, flattened, œdematous granulations.

No juice exuded from it when compressed; and when a thin section was placed on a glass slide for microscopical examination, it had somewhat the appearance of boiled white of egg; it broke up easily under the pressure of the blade of the scalpel and did not exhibit any of the tenacity of fibrous tissue.

Under the microscope its structure came out with great clearness. *First* (see Plate III, fig. 1), were recognized oval vesicular bodies of exceedingly pale aspect, containing usually two, sometimes one bright granule, imbedded in a faintly molecular material. If two granules were present, they occupied the opposite ends of the cell. These bodies resembled, in their general aspect, the oval sporules of the penicillium glaucum found in urine, but had a paler, fainter appearance. They varied in size from $\frac{1}{1500}$ to $\frac{1}{3000}$ of an inch. A few of them were reniform, and cell multiplication by fission could be occasionally

traced. Although evidently vesicular, they resembled nuclei in their insensibility to acetic acid, and in the presence of nucleoli. Very few of them were spherical; the great majority being a more or less lengthened oval. I had no difficulty in identifying them with the so-called nuclei described and figured by Mr. Paget, and Dr. Bennett, as having been found by them in recurring fibroid and fibro-nucleated tumours.

Secondly. (See Plate III, fig. 2.)—Numerous tailed and branched cells were also observed. Some of these had one prolongation; others two at opposite poles, presenting the well-known spindle-shape; others again were multipolar. The caudate prolongations were occasionally observed to be split up at their extremities into a bunch of fine fibres. In other instances the caudal appendage of one cell became continuous with the caudal appendage of another cell; and sometimes several cells were placed in continuity with each other by means of fine branches which joined together. Some portions of the tumour were entirely made up of a confused assemblage of these spindle-shaped and branched cells.

Thirdly. (See fig. 3.)—In other places there was seen a mass of very delicate fibres, netted into an intricate interlacement, in the meshes of which lay a number of the oval cells already described. On a closer examination, some of the fibres appeared as thicker tracts from which the finer filaments ramified in an arborescent fashion. Some of these thicker tracts had a firm appearance, and refracted the light strongly; and from their ends and sides sprang an infinite number of delicate branching lines like the rootlets from an under-ground stem.

Intermediate forms were found representing all the gradations of change between the oval cell and the tangled mass of fibres. It was impossible to resist the conclusion that the latter was the ultimate development of the former.

The intercellular substance was hyaline and structureless, devoid of any traces of fibrillation, and therefore altogether unlike that of the ordinary forms of white fibrous tissue. Bright molecules, and in some places minute fat globules, lay scattered through it. It appeared most abundant where the oval cells were most numerous and least changed, and least abundant where the tissue was composed most largely of the branched cells and their anastomosis of capillary prolongations.

The structure of this tumour then, if I have interpreted the appearances aright, stands midway between white fibrous tissue, yellow elastic tissue, and cartilage. It resembles the last in its hyaline intercellular substance, but differs from it in the

branching of its cells.* Its resemblance to yellow elastic tissue must be considered very marked if we accept the view of Donders respecting the histology of that tissue. Donders believes that elastic tissue is composed of a close ramification of branching cells, in the central parts and prolongations of which an elastic material has been deposited, giving thickness and elasticity to the fibres; while intercellular substance is almost altogether absent. In this tumour, or at least in what may be regarded as the most developed portions of it, there was found a tissue of fibrous appearance, evidently constructed of ramifying cells; and in some spots a stronger refraction of the light and increased thickness of the fibres, seemed to indicate a commencement of deposit within the cell-prolongations. But the fibres generally were excessively delicate and soft, offering a contrast rather than a resemblance to those of elastic tissue.

With white fibrous tissue, the present growth agreed in the possession of stellate communicating cells of delicate organization; also in the presence of a considerable amount of intercellular substance, but it contrasted notably in the total absence of any fibrillation of the latter.

The clinical history and anatomical relations of this tumour are sufficient of themselves to remove it from true cancerous growths; but it is equally removed from them by its histology. The absence of cancerous juice and of any traces of fibrillation in the intercellular substances, together with the form and development of the cells, indicate a distinct separation from malignant growths.

I have not hesitated to class this growth with those designated "recurring fibroid" by Mr. Paget. It agrees with them in its general naked eye characters, in not affecting the adjacent lymphatic glands, and in being wholly unattached to the surrounding tissues. It agrees, likewise, in the total absence of constitutional symptoms, although the tumour had been steadily progressing for ten years. Its history lacks, of course, the characteristic singled out by Mr. Paget as a basis of nomenclature because it is the first of its kind removed from the patient. Will it return? Judging by what is known of such growths, the answer must be in the affirmative; but hitherto, so far as I know, no sample of this tumour has been

* Mr. Paget has described at p. 188 of vol. ii, of his Lectures on Surgical Pathology, a tumour not unlike the present, but having stronger affinities with cartilage. It consisted of a viscid soft intercellular substance and a number of large cells; some oval or round, others branched, and two cells are represented as being connected by the fusion together of a prolongation from each.

recognized on the first removal. It is open to question, therefore, whether, inasmuch as in some four examples, already on record, the recurrence took place but once, and was then followed by permanent immunity, there may not be cases of complete recovery after the first removal.

If the view here propounded of the minute structure of these rare growths be substantiated, their varying consistency, and their similarity or dissimilarity to true fibrous tumours will probably be found to depend on the relative proportion of the cellular element to the intercellular substance. When the latter is abundant, the tumour will be soft and brain-like; when the former is in excess, the growth will be firm like ordinary fibrous tumour.

Mr. Paget found that, in a very large proportion of the cases seen by him, recurring tumours occurred in cancerous families; and he entertains the opinion that such tumours often represent what may be called a gradual fading of the cancerous diathesis. He believes that it will be found, that among the members of families in which cancer has occurred, there is a peculiar liability to the production of tumours which will recur after repeated and complete excisions, though they are neither cancerous in structure nor attended with disease in the lymphatics and other organs. "If this can be proved we may justly hold that this character of recurrence indicates the existence of the cancerous diathesis, either with less abundance or less concentration of material than is required for the production of a cancerous tumour with all the typical properties."*

In the present instance there is no evidence of hereditary taint. The patient's mother died of phthisis, and her father of old age. None of her relations in any degree are *known* to have suffered from any species of tumour or morbid growth.

* Mr. Paget. Medical Times and Gaz. Aug. 22, 1857.

LECTURES

ON THE

STRUCTURE AND GROWTH OF THE TISSUES

OF THE

HUMAN BODY.

Delivered at the Royal College of Physicians, 1861.

BY LIONEL S. BEALE, M.B., F.R.S.

(Continued from page 276, vol. ii.)

LECTURE VI.

On the Connective Tissues.—Tendon and other forms of White Fibrous Tissue. — Cartilage. — “Mucous Tissue” of the Umbilical Cord. — Fibrous Tissue formed from Inflammatory Lymph.—Bone.—Dentine.—Stellate Tissue on the Surface of the Cementum.

[As it is not possible to devote sufficient space in this and the next number of the Archives for a full report of the lectures, I propose to give only those portions which contain original observations and descriptions of the specimens exhibited—believing that this course will be most acceptable to the readers of the Archives. I shall thus be enabled to compress the consideration of the principal questions into a comparatively small space, and at the same time to complete the lectures of which five were published in the last number. The lectures will be completed in the next number, and the four remaining plates will be inserted. The lectures and plates have been published in a separate form.]

TENDON is generally subjected to examination after having been dried, or partially dried, and then remoistened with fluid, but it has been found that these processes cannot be carried out without some considerable alteration in the characters of the tissue being produced. The specimens referred to have therefore been prepared without any desiccation at all. They have been soaked in carmine solution, and afterwards mounted in glycerine, according to the method I have already adverted to.

No. 34 is a longitudinal section of a tendon of a child at birth. Observe the relation of the *germinal matter* to the *formed material*. The lines of oval masses of germinal matter are usually termed "the nucleated fibres of the tendon." These are represented in Plates IV and V, figs. 3 to 10.

In Plate V, fig. 9, longitudinal sections of a tendon from an old man, aged 74, are represented. The principal difference between this and figs. 6 and 8, which are from the kitten and child, is the greater proportion of *formed material* or *inter-cellular substance*, to the germinal matter. The "parallel nucleated fibres" are very distinct in all the specimens, but they are not nearly so close together in the old as in the young tendon. These points are shown most distinctly in Plate IV, fig. 7 *a b*; *a* is from the child at birth, *b* from the old man. Now, what is the nature of these so-called nuclei and nucleated fibres? If the tendon be stretched they form narrow lines, and the very elongated nuclei seem to be connected together by very delicate fibres (fig. 9*c*). If the specimen be roughly handled, several nuclei with pieces of fibrous tissue may be detached, and they often assume an angular form with projecting processes (fig. 6). If, on the other hand, they be stretched laterally, they become very wide, and assume an oval form (fig. 9*e, f*).

Longitudinal lines are seen in the oval 'nuclei,' and these are caused by a tendency in the germinal matter to split in the longitudinal direction, or result from peculiar creasings or markings, which, when fully formed, give rise to the fibrous appearance so characteristic of this tissue. If you attempt to make a transverse section, the stellate bodies represented in fig. 8 are obtained. It is impossible to obtain a very thin transverse section of tendon with these nuclei in their natural position. In attempting to do so, you cut off short pieces of tendon with the included nuclei. At the edge of the specimen (fig. 6) are some bands of wavy fibres detached, with the nuclei in them, and in some the immediate continuity of the fibrous structure with the so-called nucleus can be positively traced.

The masses of germinal matter which you have seen in each specimen are regarded by Virchow as areolar or connective tissue corpuscles, "*bindegewebs-körperchen*," and he states that they are connected together by tubes, so as to produce a stellate arrangement. In a longitudinal section he admits that nothing of the kind is to be seen, but in a transverse section the stellate arrangement is observable. It seems to me that this may be explained thus:—It is not possible to obtain a very thin section in which all the divided parts are *in situ*. In the transverse sections made, some of the prolongations from these

bodies are altered in position, so as to make it appear as if they passed from the corpuscle or cell between and amongst the longitudinal fibres (Plate IV, fig. 8).

These nuclei are the masses of *germinal matter* of tendon, and the fibrous substance is the *formed material* formed from it. The so-called nuclei are certainly connected with the wavy bands of the fibrous tissue, figs. 6, 9, 11. The tissue nearest the nuclei is not yet perfectly formed, and it is so soft that separation usually occurs at this point, and the nuclei or cells escape from the substance of the fibrous tissue in which they appear to have been embedded.

In the nutrition of this texture, therefore, it follows that the nutrient matter passes through, or permeates, the formed material, being drawn to the oval masses of germinal matter as towards centres. Certain of the nutrient elements then become living particles of the germinal matter of tendon, and in due order become converted into the firm, unyielding, fibrous structure or intercellular substance (formed material).

Acetic acid, as is well known, causes the wavy fibrous appearance to disappear, while it renders the so-called nuclei and their lines of connection with each other more distinct. At the same time in fully formed tendon there is a delicate network of yellow elastic tissue, the fibres of which for the most part pass round the bundles of the white fibrous tissue, and are therefore, upon the outer part in contact with the *oldest* part of the tendon, or with the formed material which was first produced.

In foetal tendon the acid does not produce so striking a change. The wavy bands, the fibrous appearance of which is not so very darkly marked as in the adult, in many cases remain; and thin bands can always be detached and are easily demonstrated to be directly continuous with the so-called nuclei. In many specimens of young tendon it is difficult to demonstrate a single fibre of undoubted yellow elastic tissue. The yellow elastic fibres are always less numerous in young than in adult tendon, while the so-called nuclear fibres are two or three times more numerous in the former than in the latter. The proportion of yellow elastic tissue, therefore, does not seem to be dependent upon the so-called nuclei. The yellow fibres where they exist are not connected with the nuclei, and are separated from them by white fibrous tissue. These elongated parallel nuclei of tendon are not concerned in the formation of yellow elastic fibres, but the germinal matter of which they are composed does become converted into the white fibrous tissue of the tendon. This germinal matter, like that of other structures,

and the fibrous material which it produces, when young and imperfectly formed, are not rendered transparent by acetic acid and other reagents, while the fully formed tissue undergoes the alteration which is so well known. I should state that I have studied the action of reagents on specimens which have been treated with carmine and soaked in glycerine. This latter substance possesses the property of retarding the action of chemical reagents, and by the slow and gradual effect produced it is advantageous.

Fig. 8, Plate IV, shows the appearance of a small piece of a longitudinal section of the tendon of a child at birth. The prolongations from the masses of germinal matter (*cells* or *nuclei*) are well seen, and their communications are tolerably numerous. The specimen has been pressed, and the disposition of the oval nuclei has therefore been altered. The processes are distinct enough in some places, but most of them gradually become lost among the wavy fibres with which all are connected and of which they are but the early stage. Although they somewhat resemble fibres of yellow elastic tissue in their general appearance and in their power of resisting the action of acetic acid, they are not of this nature; their outline is irregular, and when examined with very high powers they have a granular appearance, which is very different to the sharp outline and homogeneous appearance of the yellow elastic tissue. In the dead tissue they may be called tubes, but they are *artificial tubes*, and do not convey nutrient juices during the life of the tissue. The germinal matter and imperfectly formed tissue of which they consist, cannot be regarded as a nutrient material. It is merely an early stage of the fibrous tissue.

Moreover, it must, too, be borne in mind that the appearance so remarkably distinct in fig. 8, which results in part from the pressure to which this specimen has been subjected, is not constant. It is not seen in the specimen of adult tendon already referred to, where fibres of yellow elastic tissue are found, nor in that of the kitten, fig. 6, and in the fascia of the frog there is no more indication of such an arrangement than there is in cartilage. In some specimens of the tendon of the child which have been stretched and pressed, the appearance of stellate cells and communicating tubes is most distinct, but that it depends upon an alteration produced in the nuclei, and upon the displacement and tearing of some of the young tissue connected with them is sufficiently proved by the appearance being produced by pressure, by its absence in parts of the specimen not subjected to pressure, by the great variation in the appearances when the arrangement is produced, and by its

entire absence in certain specimens. The dark lines in fig. 8, continuous with the cells, are not elastic fibres at all, neither are they elastic tissue at an early period of its formation, as will be shown. Elastic tissue when it exists in tendon is not connected with these nuclei.

The altered appearances produced in the same piece of tendon by mere stretching and pressure are shown in Plate V, fig. 9. The fact illustrated in the drawing is most important. The drawing was carefully copied from a specimen which exhibited the usual regular arrangement before pressure was applied, and may perhaps help to explain the cause of the different statements which have been made with reference to the appearance of the so-called cells or nuclei.

How are we to account for the delicate fibres of yellow elastic tissue surrounding the fibres of many specimens of tendon? Their existence is undoubted but they are not in sufficient number to be considered as essential constituents of the tissue, and they are not to be detected in all forms of white fibrous tissue. For the most part they wind round the bundles. By great patience you may occasionally succeed in finding a nucleus connected with these fibres, but when this is so the nucleus is very small, and quite distinct from those I have described as connected with the white fibrous tissue. It is, however, very seldom that I have been able to demonstrate this nucleus in connection with the yellow elastic tissue in tendon, and from the fact that I have seen this appearance result from alterations produced in an undoubted capillary vessel, I am disposed to explain the very few cases in which I have met with it in this manner.

As a rule the fibres encircling the bundles of the white fibrous tissue are certainly not connected with nuclei. The nuclei which are constantly present, exhibit a linear arrangement at every period of the growth of tendon. The yellow elastic tissue on the other hand is not arranged in parallel lines, but the delicate fibres of which it is composed form a lax network.

As to the tubular nature of these fibres of yellow elastic tissue. In yellow fibrous tissue, from many situations I have seen prolongations of germinal matter as in other tissues, but I have completely failed to prove that these yellow elastic fibres generally are tubular, and concerned in the distribution of nutrient matter. Over and over again, I have stained the nuclei amongst the fibres of yellow elastic tissue with carmine, while not a single fibre exhibited the slightest alteration. I cannot think, therefore, that these fibres at any period of

their existence, have any such office as that of distributing nutrient fluid to the tissues in connection with which they are found.

Fig. 5, Plate IV, is a portion of the white fibrous tissue from the fascia covering the muscles of a frog, and this specimen is quite destitute of the yellow elastic tissue. The oval masses of germinal matter, coloured dark red with carmine, are, however, very distinct, and their continuity with the fibrous tissue is equally positive.

Fig. 11, Plate V, represents a vertical section of a piece of thick lymph lying between the liver and diaphragm, from a man who died of scrofulous enlargement or amyloid degeneration of the liver. The mass adhered slightly to the fibrous capsule of the liver, but it could be removed without being torn. In one or two places it adhered very intimately, and had undergone conversion into white fibrous tissue, but the layer generally was not in vascular connection with the adjacent parts. Similar extensive layers of lymph were found over the surface of the intestines. The germinal matter and formed material can be seen most distinctly in the specimen, and the arrangement of the meshes of fibrous tissue is almost as regular as that observed in the proper tissue of the cornea.

We, therefore, conclude that tendon, like fascia and other textures consists of *germinal matter* and *formed material*, and that the formed material bears the same relation to the germinal matter as in other tissues; that the so-called nuclei of the nuclear fibres are the masses of germinal matter which produce the fibrous tissue of the tendon; that the elongated fibres intervening between the cells or nuclei consist of soft material undergoing the process of conversion into the harder fibrous tissue. This soft substance is soon broken down after death and liquefied, and these straight tubes, which are artificially produced, seem to intervene between the oval masses of germinal matter, so that we have a series of straight tubes pursuing a longitudinal course in all parts of the tendon, and exhibiting here and there a dilated portion.

In my last lecture I shall bring forward evidence to show that many tissues which, after having existed in a state of functional activity for a certain time, waste and disappear, leave behind a certain quantity of transparent fibrous tissue, which is not completely removed by absorption. If muscle or nerve waste from any cause, a structure somewhat resembling white fibrous tissue remains behind, and in some cases a similar structure occupies the situation which was filled by a vessel at an earlier period. Let me draw your attention at once to the

cord-like network of fibres in connection with the external coat of a small branch of artery. The specimen is taken from the abdominal cavity of a frog. (Figs. 1 and 2, Plate IV.)

Fig. 1, shows the appearance alluded to under a power of 130; *a* is the outer part of the muscular coat of the artery. A bundle of nerve fibres is seen running in the external coat of the artery, and at *c* some of the fibres are seen to leave the large trunk of the nerve and run in the central part of some of the fibrous cords. In fig. 2 a portion of one of these cords with most distinct nerve fibres is seen magnified 700 diameters, and a transition may be traced from most undoubted nerve fibres to the very narrow branching fibres seen in the upper part of the specimen. These fibres are not altered by acetic acid, but by careful examination it is clearly proved that they may be split up into finer fibres if they are not actually composed of several minute fibres collected together. They somewhat agree in character with the axis cylinder of a nerve fibre. Some of the finest of these cord-like fibres of connective tissue seem to consist of a transparent matrix, in which two or three nerve fibres are embedded. The transparent matrix is the so-called tubular membrane of the nerve fibre. I consider, therefore, that the nuclei and delicate fibres continuous with them, embedded in a more or less fibrous connective tissue, are nerve fibres which were functionally active at an earlier period of life, and that the matrix in which they are embedded corresponds to the so-called tubular membrane. At *e*, three very fine nerve fibres embedded in a matrix are represented, and the fibres represented at *f* are probably altered nerve fibres.

There are in different parts of the frog, especially in connection with the skin and areolar tissue beneath, cord-like fibres very much resembling those just described in their general appearance, but differing from them in the disposition of the nuclei and in the matter which passes between the nuclei, being granular and less fibre-like. Such fibres have the general appearance represented at *b*, fig. 10, and are composed of white fibrous tissue with its nuclei and their prolongations (formed material and germinal matter).

The mode of development of these thick cord-like fibres of connective tissue is represented in fig. 10, from the cutis of the frog. At *a*, numerous oval nuclei are seen undergoing division which occurs transversely and longitudinally. The distance between each gradually becomes increased, and for some time granular matter may be seen intervening between one nucleus and the other. In this case a reticulated arrange-

ment exists, as in certain forms of fibrous tissue and the fully formed tissue represented in fig. 10*b* forms a variety of connective tissue between tendon and fascia where the nuclei form straight lines; and the outer part of the periosteum and areolar tissue generally, where they assume a stellate form.

It is difficult to distinguish the points to which I have adverted in every individual case, but that fibres resembling elastic tissue in their behaviour with acetic acid, are immediately continuous with nerves, and remain in situations where nerves had been abundantly distributed at an earlier period of life will, I think, be fully proved in my last lecture.

Permit me to sum up the prolonged discussion on this question in a few words.

A tissue possessing the characters of white fibrous tissue may be formed like other tissues from germinal matter, or it may result from changes taking place in tissues which originally possessed much higher endowments. In the last case it may serve as a support to the new texture which is developed, and as life advances this tissue, the débris of more important structures, becomes, in certain localities, more abundant. Although it is true that many very different forms of white fibrous tissue exist, it is interesting to observe, in certain cases, the great similarity between the arrangement of the lowest temporary forms of this tissue, of which false membranes are composed, and that of the higher and more permanent forms of the structure, as seen in tendon, fascia, and even the proper tissue of the cornea. (Figs. 3, 4, 5, 6, 7, 11.)

In prep. 38, at one view, you may see some of the youngest portions of the ensiform cartilage of the mouse and its connection with tendon to which muscular fibres are attached. The matrix of the cartilage is in direct continuity with the fibrous tissue of the tendon. Upon a careful examination of this specimen you will observe that the youngest elementary parts are only separated from each other by a very thin line of formed material, and the germinal matter tinted with carmine, seems to shade gradually into the intervening substance. As you pass outwards you see the proportion of formed material between each oval mass, or between the collections of masses, of germinal matter gradually increasing. These very important points are most satisfactorily shown in specimens treated with carmine. As in other tissues, the relative proportion of the germinal matter to the formed material of cartilage, gradually becomes less as we pass from the youngest towards the older parts of the tissue, or, in other words, as the elementary parts advance in age.

Fig. 16, Plate VI, is a thin section through the tendo Achillis and os calcis (in that part which is now cartilagenous) of a kitten soon after birth. In the centre of the specimen is a line marked by the existence of capillary vessels (*a*). This divides the cartilage from the tendon. Observe in this specimen how closely the two structures resemble each other in general appearance. The arrangement of the germinal matter and formed material is the same in both, except that in the tendon there is already an indication of parallel fibres. The proportion of the germinal matter and formed material is about the same in both tissues. In the cartilage the masses of germinal matter divide, and the resulting portions at once become *separate masses*. In the tendon the masses divide, but the resulting portions are *connected together* for some time by a thin line of germinal matter. Between the cartilage and the tendon is a layer which eventually becomes the periosteum. The stellate arrangement of the masses of germinal matter (areolar or connective tissue corpuscles) is very distinct, and their character is retained in the adult tissue. In the drawing this layer is represented. (Fig. 16, *b*, Plate VI).

At an early period of development of all forms of cartilage, masses of germinal matter are seen situated very close to each other, and as the growth advances, the quantity of formed material between them (matrix, intercellular substance) gradually increases. It is formed from the germinal matter. If you examine any of those cartilages in which small parcels of cells exist at intervals through the matrix, you will observe that there exists a greater amount of formed material between the various collections, than between any of the individual masses of each collection. If it be admitted that the matrix is formed from the masses of germinal matter this fact is at once explained. The more recent the division of the mass of germinal matter the thinner will be the intervening layer of formed material between the resulting masses.

In fig. 15 several elementary parts of cartilage from the frog are represented in different stages of growth. The manner in which the matrix is formed is, I think, easily understood after a careful examination of these specimens. At *a*, large oval masses of germinal matter are seen to be separated from each other by a very thin layer of soft formed material (matrix). At *b*, this has increased, but as the germinal matter grows, while the conversion of its outer portion into formed material proceeds, the elementary part becomes larger. The next stage is shown in *c*. In *d*, *e*, *f*, *g*, *h*, growth has ceased, and the germinal matter gradually undergoes conversion into formed

material until at last only what is termed the nucleus remains, and this in many instances dies and a small oval collection of granules, which are not tinged red with carmine, *h*, is all that marks the position of the germinal matter of the cartilage cells by which the matrix, or formed material, has been produced. After this has occurred the matrix may become harder and undergo other changes, but no more can be produced. The *formation* of the matrix has ceased. The matrix, close to the germinal matter which is recently formed is of course soft, and when it is broken away the mass of germinal matter within escapes entire. In all tissues the bond of union between the germinal matter and formed material is very slight; a fact which receives a simple explanation upon the view of growth brought forward. The matrix gradually undergoes condensation and probably contracts somewhat after it has been formed.

In fig. 17 the formation of fat, a change which is not unfrequently observed in cartilage, is traced. A small globule of fatty matter, is first seen in the germinal matter of an elementary part external to the nucleus (fig. 17 *d*), as this increases the nucleus is pushed over to one side, and gradually becomes compressed between the fatty matter and the recently formed matrix of the cartilage. The changes occurring in cartilage during the formation of fatty matter resemble those which take place in the development of ordinary adipose tissue.

The formation of cartilage is generally described in a very different manner. It has been said that the membranous capsule of the cartilage cell *sends in septa* when the cells it contains, undergo division "which serve as new envelopes for the young cells, yet in such a way, that even the gigantic groups of cells, which proceed from each of the original cells, are still enclosed in the greatly enlarged parent capsules." (Virchow).

Against this theory I have endeavoured to show that the matrix or intercellular substance with the membranous capsules of the cartilage cells corresponds with the cell wall of a spore of mildew, Plate XII, Vol. II. This outer capsule of the mildew, as I have tried to prove, does not possess the power of growth. It is the internal germinal matter which is alone concerned in the growth of the plant. So in cartilage, the matrix was once in the state of germinal matter. The septa do not *extend themselves in, or grow in*, but the material of which they are composed results from an alteration taking place in the oldest particles of the germinal matter.

EXPLANATION OF THE PLATES.

PLATE I.

To Illustrate Mr. Lockhart Clarke's Observations on the Structure of the Cord in a case of Muscular Atrophy accompanied with Disease of the Cord (p. 13).

Fig. 1. Transverse section of right lateral half of the grey substance of the spinal cord, with the anterior and posterior commissures, at the upper third of the cervical enlargement. A, *a*. *Caput cornu posterioris*. *a*. The *gelatinous substance*. B, B'. *Cervix cornu posterioris*. B. Group of cells called the posterior vesicular column. B'. Longitudinal bundles of the cervix. D. Anterior grey substance or cornu. C, C. Anterior or motor nerves connected with it. *e*. Anterior median fissure, at the bottom of which are the decussating fibres of the anterior commissure. *f*. Central canal, closed in this section by a mass of epithelial nuclei. *g*. A somewhat triangular spot of finely granular degeneration on the left side of the posterior commissure. *m*. A much larger lesional space, in the middle of the cervix cornu, and containing two blood-vessels. *n*. Another at the base of the cervix cornu, between the anterior and posterior commissures, and also containing blood-vessels. *o*. An oval lesional spot, at the posterior and inner part of the *cervix cornu*, and encroaching on the base of the *caput cornu*. $\times 34$ diameters, but reduced one-half from the drawing.

Fig. 2. Transverse section of the entire grey substance at the origin of the fourth pair of cervical nerves. *a*. *Caput cornu posterioris*. *b*. *Cervix cornu*. *d*. Anterior grey substance or cornu. *c*. Tractus intermedio-lateralis. *e*. Anterior median fissure. *f*. Posterior median fissure. *g*, *h*. Lesional spaces of the grey substance.

Fig. 3. One of the lesional spots, magnified 210 diameters, reduced one-half from the drawing magnified 420 diameters. *i*. A short canal in the centre of the spot. *k*. Broken nerve-fibres of the surrounding healthy tissue.

Fig. 4. Portion of another lesional space, magnified 700 diameters.

PLATE II.

To Illustrate Dr. Tilt's Observations on the Exfoliation of Mucous Membranes from the Womb and the Vagina during Menstrual Periods (p. 26).

Fig. 1. Membranous substance passed with a blood-clot, during the menstrual period, probably from the vagina. (Case II, p. 31).

Figs. 2 and 3. Two fragments of a uterine cast, passed by a lady, age 25. (Case I, p. 27.)

Fig. 4. Cast of the womb and vagina, the mucous covering belonging to the former cavity being inverted. (Case II, p. 29.) From a drawing by Dr. Vannoni of Florence.

PLATE III.

To Illustrate Dr. Roberts's Observations on the Histology of a Recurring Fibroid Tumour (p. 19).

Fig. 1. Thin section of the tumour showing pale oval vesicular bodies, containing usually two, sometimes one bright granule imbedded in a faintly molecular material.

Fig. 2. Numerous tailed and branched cells also seen in a thin section, some spindle shaped, others multipolar. The caudate prolongations were occasionally observed to be split up at their extremities into a bunch of fine fibres.

Fig. 3. Delicate fibres seen on other parts. These formed an inextricable interlacement, in the muscles of which lay a number of the oval cells represented in fig. 1.

PLATE IV.

To Illustrate the Structure of certain forms of white Fibrous Tissue.

Fig. 1. Connective-tissue, forming a network of rounded cords continuous with the areolar coat of a small artery. From the abdominal cavity of a frog. A part of the muscular coat of the artery is shown at *a*. A nerve is seen at *b* running in the external areolar coat. At *c* the bundle of nerve fibres is seen to divide, and several fibres are imbedded in the connective tissue, of which the rounded cords are composed.

Fig. 2. *d* small piece of one of the cords represented in the upper part of fig. 26 at *b*. Several nerve fibres are seen, and in the upper part of the drawing some very fine fibres. These are probably altered nerve fibres.

At *e* another portion of a true but very fine nerve fibre is represented. Three distinct fibres are in a clear transparent matrix, the so-called tubular membrane. *f*, a portion of one of the finest cords in fig. 26. Nuclei with branching fibres are seen, and the distribution of these is very similar to that of the fibres represented in the upper figure.

Fig. 3. The extremities of two elementary muscular fibres, showing their connection with the tendon, from the eye of the frog. The oval masses of germinal matter (considered by some to be nuclei, and by others, as spaces), are seen both in the muscle and tendon. Those in the muscle are connected with the formation of the contractile tissue, while those in the tendon take part in its production.

Fig. 4. Periosteum from the frog, showing the masses of germinal matter from which it is produced.

Fig. 5. White fibrous tissue. Fascia from the frog.

Fig. 6. Tendo Achillis, kitten at birth, showing the "nuclear fibres," consisting of oval masses of germinal matter, with narrow intervening portions, which have been described as consisting of yellow elastic tissue.

Fig. 7. Tendon of finger at different ages, magnified 215 diameters, showing relative proportion of oval masses of germinal matter, and formed material; *a*. Child at birth; *b*. Old man aged 74.

Fig. 8. Tendon from the finger. Child at birth. The preparation has been altered by tearing and pressure. Prolongations from the germinal matter are seen at various points, giving the masses a stellate appearance. These prolongations are seen to terminate in the tissue of the tendon; on a level with *a* in the central part of the figure the arrangement is represented.

PLATE V.

To Illustrate the Structure of certain forms of Fibrous Tissue.

Fig. 9. Tendon from finger of an old man, age 74, showing different appearances produced in the oval masses of germinal matter (nuclei) by stretching in different directions.

a. Appearance of prolongation of germinal matter stretched longitudinally (nuclear fibre) under a power of 1700 diameters.

b. Appearance of fine fibre of yellow elastic tissue under the same power.

c. Fibre stretched in a longitudinal direction.

d. Appearance generally observed in unstretched tendon.

e. Fibre slightly stretched laterally.

f. Appearance produced when the fibre was stretched laterally and subjected to pressure.

Fig. 10. Development of bundles of fibrous tissue connected with the subcutaneous areolar tissue of the frog. *a.* At an early period. *b.* When the bundle of fibres has been formed. The nuclei are seen to be separated by a considerable distance, but are connected together with a certain proportion of imperfectly formed tissue, which is soft and still granular. This is represented in the drawing rather wider than it is in nature.

Fig. 11. Thick false membrane found between the liver and diaphragm. *a.* A thin section under a power of 215. *b.* An elementary part separated, showing the germinal matter and formed material. Magnified 700 diameters.

Fig. 12. The so-called mucons tissue of the umbilical cord, showing the oval masses of germinal matter and the fibrous tissue or formed material, under a power of 130 diameters. Compare this figure with fig. 11.

Fig. 13. A portion of this preparation represented in Fig. 12 magnified 700 diameters. The relation of the germinal matter to the formed material seems to be the same as in other forms of fibrous tissue. The anastomosing nutrient tubes described by Virchow could not be demonstrated in this specimen.

Fig. 14. A few of the muscular fibre-cells, from the wall of one of the arteries of the umbilical cord.

PLATE VI.

Illustrating the Structure and Growth of Cartilage.

Fig. 15. From the frog.

a. Very young cartilage composed of oval masses of germinal matter, separated by a small quantity of soft and imperfectly formed intervening substance.

b. One of the masses of germinal matter which exhibits an outer portion which is only slightly coloured by carmine, and a central part more darkly coloured. The outer portion is gradually becoming converted into matrix.

c. An elementary part showing zones of different ages. The outermost only is perfectly-formed cartilage. Next come layers of germinal matter, which are slowly undergoing conversion into cartilage, and lastly the *nucleus* is seen in the centre of the mass.

d. An older elementary part, consisting of fully-formed cartilage, recently-formed cartilage, germinal matter, and the nucleus.

PLATE I.

Fig. 1.



$\times 34$ and reduced $\frac{1}{2}$.

Fig. 2.

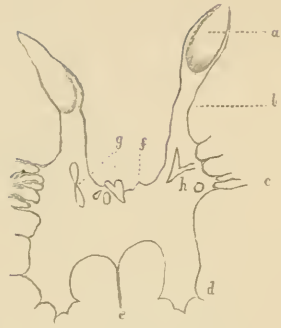
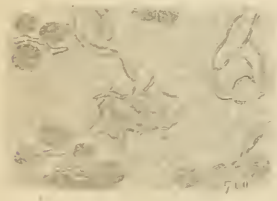


Fig. 3.



$\times 420$ and reduced $\frac{1}{2}$.

Fig. 4.



CHORDATE GLOUCESTER (C. C.)

CHORDATE GLOUCESTER (C. C.)



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

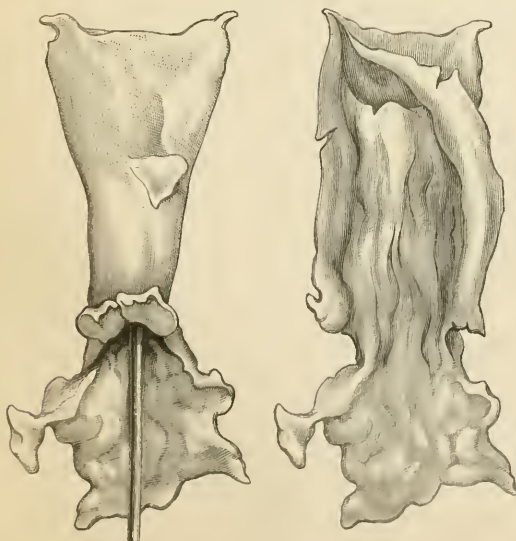




Fig. 1.



Fig. 2.



Fig. 3.



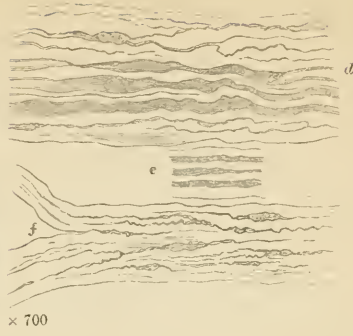


Fig. 3.



Fig. 4.



Fig. 5.

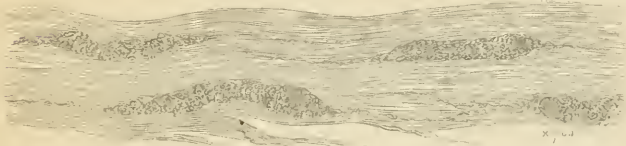


Fig. 6.

Fig. 7.

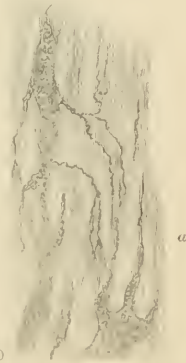
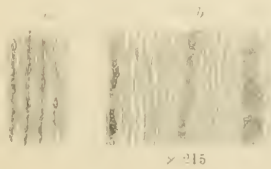
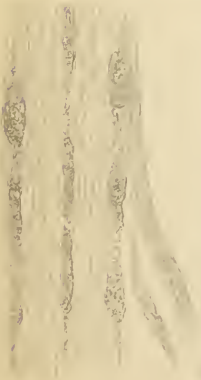




Fig. 9.



Fig. 10.



Fig. 11.



Fig. 12.

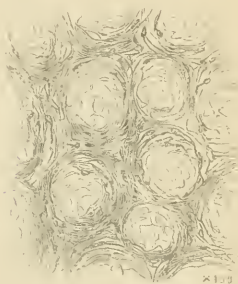


Fig. 13.



Fig. 14.

1000ths x 215
1000ths x 700



Now Ready.

Price 15s. each, Cloth 8vo.

With copious Index, Table of Contents, &c., Woodcuts, and Plates, many of which are coloured.

VOLS. I. & II.

OF THE

ARCHIVES

OF

MEDICINE,

WITH ORIGINAL PAPERS AND COMMUNICATIONS FROM THE
FOLLOWING CONTRIBUTORS.

Charles Allfrey.	P. Eade, M.D.	W. H. Michael, M.R.C.S.
Scott Alison, M.D.	Arthur Farre, M.D., F.R.S.	H. Munroe, M.D.
J. T. Arlidge, M.D.	G. D. Gibb, M.D.	Charles Murchison, M.D.
Milner Barry, M.D.	W. A. Guy, M.D., F.S.S.	S. Newham.
R. Barwell, F.R.C.S.	Robinson Hill, M.D.	John Ogle, M.D.
Lionel Beale, M.B., F.R.S.	J. W. Hulke, F.R.C.S.	William Ogle, M.D.
Warburton Begbie, M.D.	E. C. Hulme, F.R.C.S.	Charles Parsons, M.R.C.S.
S. D. Bird, M.R.C.S.	W. E. Image, F.R.C.S.	Edward Ray, F.R.C.S.
Moritz Von Bose, Ph. D.	Rev. G. S. B. Isbell.	Chas. Roberts, M.R.C.S.
W. Cayley, M.R.C.S.	George Johnson, M.D.	Russell Reynolds, M.D.
Robert Ceely, M.R.C.S.	Handfield Jones, M.D., F.R.S.	George Scott, M.D.
Gilbert Child, M.D.	G. Kennion, M.D.	A. E. Sansom, M.B.
Lockhart Clarke, F.R.C.S.	R. Lawson, Dir. Gen.	J. W. Suffolk.
George R. Cubitt, M.R.C.S.	Henry Lee, F.R.C.S.	Robert Taylor, F.R.C.S.
Edwin Day, M.R.C.S.	W. Marcet, M.D., F.R.S.	Robert B. Todd, M.D., F.R.S.
A. B. Duffin, M.D.	S. Martyn, M.D.	Charles Workman, M.R.C.S.

Subscribers' Names may be sent to the Editor.

Copies will be forwarded on the morning of publication, post free, to gentlemen who send their addresses, accompanied with a remittance for their subscription, to the Editor, King's College, London.

COMMUNICATIONS FOR THE "ARCHIVES" ARE
ARRANGED UNDER THE FOLLOWING HEADS.

- I. Clinical Observations.
- II. Original Researches in Anatomy and Physiology, and Morbid Anatomy and Pathology.
- III. Results of the chemical and microscopical examination of the solid organs and secretions in a healthy and morbid state.
- IV. Processes and instruments of practical value in carrying out Scientific Inquiries bearing upon Medicine.
- V. Condensed reports of researches published elsewhere.

NOTICE TO CONTRIBUTORS.

Every contributor is entitled to receive 12 copies of his paper. Several authors of papers have expressed a desire to be furnished with a greater number of copies than 12. The arrangements for reprinting separate copies of papers are always complicated, expensive, and troublesome, but as I am fully conscious of the great convenience of these separate copies to the authors, I have arranged with Messrs. Harrison to supply them on certain conditions, and on the following terms:—

1. All copies above 12, not to be circulated until three months after the publication of the journal.
2. The expense to be borne by the authors, according to the following scale:—

Communications of 16 pages (1 sheet) and upwards, at the rate of 3s. per sheet per ten copies, including paper, and so on for each sheet. *Example—A paper of 20 pages will cost 3s. 9d. per ten copies. 75 copies would be at the rate of 9s. 6d. per sheet.*

Communications of less than 16 pages and more than 8 at the rate of 3d. a page per ten copies. *Example—A paper of 10 pages will cost about 2s. 6d. per ten copies.*

Communications of 8 pages and less at the rate of about 4d. a page per ten copies. *Example—A paper of 3 pages will cost 1s. per ten copies.*

If more than 100 copies are required a very considerable reduction will be made in the above sums.

Plates 1d. each copy, unless more than 50 copies are required. Coloured plates average 3d. each copy.

3. *The Editor begs that all copies may be paid for WHEN ORDERED as he cannot ask Messrs. Harrison to keep small accounts.*

* * Applications for extra copies must be made to the Editor as soon as the paper is in type.

Other communications to be addressed to the Editor.

Annual Subscription, due October 1st, 1861, 10s

ARCHIVES OF MEDICINE,

Enlarged to Four Numbers in the Year.

*Please to enter my Name as a Subscriber to the Archives of
Medicine, from October 1st, 1861.—Enclosed is an Order for
10s., Annual Subscription, for 1861-62.*

_____ *Med. Titles.*

Address _____

To the Editor of the Archives of Medicine.

**** Copies of the Archives of Medicine will be sent post free on the morning of publication to all subscribers who will send their Names and Addresses to the Editor, King's College, London, but no Copies will in future be forwarded, unless the subscription has been already received, as no accounts can be kept.**

To the Editor of the

ARCHIVES OF MEDICINE,

King's College,

London, W.C.

Now ready, 2nd Edition, Illustrated, price 5s. 6d.

HOW TO WORK WITH THE MICROSCOPE. A

Guide to the Practical Use of the Instrument, with directions for examining and preserving Specimens, &c.

With XXXII Plates containing upwards of 150 separate Figures with Explanation.

CONTENTS.

- I. The Simple and Compound Microscope—Makers of Microscopes—Choice of a Microscope—Travelling and Dissecting Microscopes.
- II. Examination of Objects by Reflected, Transmitted, and Polarized Light—Dark ground Illumination—Illumination—On Drawing and Measuring Objects—Ascertaining the Magnifying Power of Object Glasses.
- III. Instruments required for Dissection—Valentin's Knife, &c.—Cements—Preservative Solutions.
- IV. On making Cells—Brunswick Black, and different forms of Glass, Cells for preserving Specimens.
- V. On examining objects in the Microscope—Muscular Tissue—Of making Minute Dissections—Hardening Textures—Of examining Objects in Air, Water, and Canada Balsam.
- VI. Of Preserving different Structures permanently—Of separating Deposits from Fluids.
- VII. Of Injecting—Apparatus, &c.—Of Natural and Artificial Injections—Of the advantages of Transparent Injections—Of the Prussian Blue Injecting Fluid—Injecting Mollusca, Insects, &c.
- VIII. Of the use of Chemical Reagents in Microscopical Investigation—Fallacies to be guarded against—Presence of Extraneous Substances—Conclusion.

Tables for practising the use of the Microscope and Manipulation.

Apparatus required in Microscopical Investigation.

"The lectures of Dr. Beale are excellently adapted for the purpose to which they are devoted. The directions are plain and intelligible, and the student who follows the successive steps here offered to him can scarcely fail to understand the uses and mechanism of the microscope." * * * The last lecture is probably the most important and full of originality, and its first part treats of what may be fairly called the Chemistry of Microscopy. The use of chemical reagents in microscopical investigations is the very refinement of Chemistry, and its advantages in examining the minimum of quantity are at once apparent. The Author's opinion on this branch of minute inquiry we freely give, as it opens out a new field of research which has hitherto been left almost untouched."—*Medico-Chirurgical Review*.

"This is one of the most useful and practical works which has yet issued from the press on the subject of the microscope; it is not only likely to prove of the utmost value to the student, but also to the busy practitioner who may find time profitably to consult its pages. * * * This little work will supply the student with everything he desires to know about the microscope, it will teach him to study it practically, and without saying too much, it will fully explain to him 'How to work with the microscope.' We recommend it to every one with satisfaction."

"We confidently recommend Dr. Beale's work to all those who wish to obtain accurate results from the use of the microscope, and by its means to enlarge the boundaries of natural science."—*Medical Times and Gazette*."

THE ILLUSTRATIONS

TO

HOW TO WORK WITH THE MICROSCOPE

Are published separately, Price 1s. 6d., and may be inserted into the first Edition of the Work.

LONDON: JOHN CHURCHILL.

RECENTLY PUBLISHED.

8vo., Cloth, 9s. 6d.

ILLUSTRATIONS OF URINE, URINARY DEPOSITS, and Calculi. 35 plates, containing upwards of 170 Figures carefully copied from the Objects, and lithographed; with descriptive letter-press.

"For convenience of reference, and as affording the readiest means of studying the Urine microscopically and chemically, we know of no work to be compared to the present, and we recommend it to the student and the busy practitioner of medicine."—*Lancet*.

"Dr. Beale has conferred a boon upon the profession by the publication of this work. The drawings are accurate and very numerous; the descriptions of the general characters of the deposits are clear, and the work is compact, and it will prove to be a valuable aid to the practitioner and student in examining the urine microscopically."—*Ranking and Radcliffe's Half-yearly Abstract*.

"We have before expressed our opinion of the very practical character of Dr. Beale's publications. The work at present before us is pre-eminently practical. It is exactly what the busy practitioner and the medical student alike require to enable them to become, with the least possible expenditure of time and trouble, what is in the present day so indispensable they should both be, practical microscopists."—*Dublin Medical Press*.

Cloth, 8vo., 14s.

THE USE OF THE MICROSCOPE IN PRACTICAL Medicine, by LIONEL BEALE, M.B., F.R.S., Second Edition, almost re- written, and much enlarged, 270 Wood Cuts, and a Coloured Plate.

PREFACE TO THE SECOND EDITION.

"The Author has endeavoured to increase the usefulness of the work, and render it as practical as possible. With this view it has been revised throughout, and many of the articles have been entirely re-written. Much that related merely to manipulation in the first edition, will be found in "How to Work with the Microscope," and has, therefore, been omitted in the present one. In place of this, much matter bearing more exclusively upon Medicine has been introduced, and upwards of sixty new and original woodcuts have been inserted.

THE ANATOMY OF THE LIVER. Numerous Plates. *A New Edition preparing.*

LONDON: JOHN CHURCHILL.

Now ready, 8vo., pp. 200,

BY

LIONEL S. BEALE, M.B., F.R.S.

ON THE STRUCTURE OF THE SIMPLE TISSUES

of the Human Body, with some observations on their development, growth, nutrition, and decay; and on certain changes occurring in disease.

A Course of Lectures given at the Royal College of Physicians, April and May, 1861. Illustrated with 10 plates, containing 70 original drawings illustrating the anatomy of certain vegetable tissues: The formation of starch—Cancerous growths—Various forms of white fibrous tissue—False membrane—Mucous tissue of the umbilical cord—Muscular fibre cells—Development of cartilage—Development of bone—The formation of lacunæ and canaliculi—The structure and formation of dentine—Tissue with stellate cells—Ganglia from the pericardium—Large fibre-cells from the aorta, &c.

All the figures have been drawn to a scale, and each one can be measured and compared with others. Several represent the appearances observed when the specimens were examined under a power of 1700 diameter.

CONTENTS.

A descriptive list of 61 microscopical specimens which were exhibited at the lectures.

LECTURE I.

Introductory—Importance of various methods of preparing tissues.

LECTURE II.

Of the structure of the simplest living beings.

LECTURE III.

Of the tissues of the higher animals and man.

LECTURE IV.

Of the increase of elementary parts—The effects of the conditions under which they grow being altered—Of pus—Of morbid growths.

LECTURE V.

Of morbid growths—Of the development, growth, nutrition, decay, and removal of tissues—Of secretion—Of the changes occurring in living matter.

LECTURE VI.

On the connective tissue series—Classification of tissues—Areolar or connective tissue—Areolar tissue corpuscles—Tendon and other forms of white fibrous tissue—Cartilage—'Mucous tissue' of the umbilical cord—Fibrous tissue formed from inflammatory lymph—Bone—Dentine—Stellate tissue on the surface of the cementum.

LECTURE VII.

Connective tissue—Intercellular substance (formed material)—Cells or nuclei (germinal matter)—Areolar or connective tissue corpuscles, and the system of communicating nutrient channels—Areolar tissue—Nerves in skin of mouse—Mucous membrane of fauces—Pericardium, its nerves and ganglia—Voluntary muscles—General remarks on areolar tissue—Conclusion.

Summary of results.

Explanation of the plates.

THE DESCRIPTIVE LIST OF THE SPECIMENS, with a colored plate, is published separately. Price 2s.

LONDON: JOHN CHURCHILL.

NOW READY 450 pp., Price 8s. 6d.,

BY

LIONEL S. BEALE, M.B., F.R.S.,

ON

URINE, URINARY DEPOSITS AND CALCULI,

Illustrated with numerous Engravings on Wood.

ARRANGEMENT OF CONTENTS.

HEALTHY URINE.

GENERAL EXAMINATION OF URINE :—

- I. Volatile Constituents. II. Organic Constituents. III. Inorganic Constituents.

SYSTEMATIC, QUALITATIVE, OR QUANTITATIVE EXAMINATION OF URINE :—

- I. Organic Constituents. II. Inorganic Constituents.

COMPOSITION OF HEALTHY URINE, AND THE QUANTITY OF THE DIFFERENT CONSTITUENTS EXCRETED IN TWENTY-FOUR HOURS.

URINE IN DISEASE.

- I. On Diathesis. II. Excess or Deficiency of the Water and Organic Constituents. III. Excess or Deficiency of the Inorganic Constituents. IV. Soluble Substances present in Urine in Disease which do not exist in the Healthy Secretion.

THE KIDNEY.

ANATOMY AND ACTION IN HEALTH AND DISEASE :—

- I. Anatomy. II. The formation of Casts of the Uriniferous Tubes. III. Morbid Changes in Structure.

URINE IN DISEASE.

EXAMINATION AND PRESERVATION OF URINARY DEPOSITS :—

- I. Examination of Urine. II. The preservation of Deposits. III. Of Extraneous Matters accidentally present.

URINARY DEPOSITS.

INSOLUBLE MATTERS :—

- I. Substances floating on the surface of the Urine or diffused through it. II. Of Light and Flocculent Deposits. III. Of Dense and Opaque Deposits. IV. Of Granular and Crystalline Deposits. V. Substances very rarely met with. VI. Entozoa.

URINARY CALCULI.

- I. General Considerations II. Calculi which leave only a trace of fixed residue. III. Calculi leaving much fixed residue. IV. Of the Origin and Formation of Urinary Calculi.

THE VOLUMETRIC PROCESS OF ANALYSIS.

SUMMARY OF THE MOST IMPORTANT CONSTITUENTS IN URINE IN HEALTH AND DISEASE :—

- I. Directions for making a rough general analysis. II. Microscopical examination of Urinary Deposits.

APPARATUS AND TESTS REQUIRED FOR THE CLINICAL EXAMINATION OF URINE :—

- I. Microscopical Apparatus. II. Chemical Apparatus. III. Tests.

TABLES FOR THE SYSTEMATIC QUANTITATIVE EXAMINATION OF URINE.

WEIGHTS AND MEASURES.

INDEX.

LONDON: JOHN CHURCHILL.

LECTURES AND DEMONSTRATIONS

ON THE USE OF THE

MICROSCOPE IN CLINICAL INVESTIGATION.

Dr. BEALE proposes to commence his course on *Friday, October 4th*,

The Lectures and Demonstrations will be given at *King's College Hospital*, on the *first and third Fridays of the month*, during the Winter Session, at 9.30 A.M.

This course is free to Students of the third year and upwards, and former Students of the College. Gentlemen unconnected with the School pay a Fee of £2 2s. at the Secretary's Office in the College.

The specimens illustrating each Lecture will be exhibited in portable microscopes.

Lecture I. Friday, October 4th, 9.30 A.M.

INTRODUCTORY—Methods of examination—General observations on the examination of the secretions in disease—Microscope—Specimens—Sputum—Vomit—Urine, &c.

Lecture II. Friday, October 18th, 9.30 A.M.

SPUTUM—Various structures met with in sputum—Extraneous matters in sputum—Sputum in various diseases.

Lecture III. Friday, November 1st, 9.30 A.M.

VOMIT—Various structures met with in vomit—Extraneous matters—Fungi—Sarcinæ, &c.—Vomit in various diseases.

PHYSIOLOGY—ELEMENTARY COURSE,

By Dr. BEALE.

These Lectures will be given on *Wednesday Evenings*, during the Winter Session, at 8 P.M., commencing on October 16th. Every alternate-Lecture will be devoted to the demonstration of objects, which will be passed round in portable microscopes.

The first six Lectures will be devoted to a consideration of the minute structure of the tissues of man and the higher animals. Fee, £1 11s. 6d. For syllabus and further information, apply to J. W. CUNNINGHAM, Esq., King's College, London.

UPPINGHAM SCHOLARSHIPS.

The Uppingham Scholarships were awarded as follows:—One of £70 per annum, tenable at the school for five years, to Francis Gage Freeman, educated at home. James Fitzgerald, of Uppingham School, and Augustin Hillier Pieritz, educated at home, were bracketed for the second place, and both elected to scholarships of the same value as the above. Francis David Morice, of Uppingham School, was mentioned with credit. The Rev. W. W. Witts, M.A., of King's College, Cambridge, was the examiner. These examinations are annual in Easter week.

The School is endowed with Twelve Exhibitions, of £40 per annum each, tenable for four years by Students resident at any College in Oxford or Cambridge. Three of these Exhibitions are vacant every year. The only qualification required for Candidates is that they shall have been at Uppingham School for the two years previous to the election.

There are also Sixteen Exhibitions at the following Colleges in Cambridge:—St. John's, Clare, Emmanuel, and Sidney Sussex; four at each, varying from £16 to £26 per annum, to which Scholars from Uppingham and Oakham Schools have the preference.

ST. JOHN'S HOUSE,
TRAINING INSTITUTION FOR NURSES,

Norfolk Street, Strand, W.C.

IN consequence of applications, from time to time received, for the temporary admission of women to this Institution, for the purpose of such systematic instruction and training as would qualify them for the duty of nurses to the poor in sickness; it is now in contemplation to provide greater facilities than at present exist, for the special purpose of careful training and discipline in the various duties of nurses for the poor—*both in cases of midwifery and general sickness.*

As a necessary preliminary to arrangements for carrying out such training, in King's College Hospital, it is desired to ascertain, as far as possible, both the extent of the existing want of such trained nurses, especially in country parishes, and the probable amount of co-operation to be obtained from the Parochial Clergy, Medical Men, and others, in furtherance of the proposed plan.

Communications on this subject are, therefore, earnestly invited from those interested in the welfare of the poor—and especially from the Parochial Clergy and Medical Practitioners; together with such information as they can kindly give, particularly with reference to the following points:—

1.—The need existing for such trained nurses in their respective neighbourhoods.

2.—The population of their respective Parishes or Districts, and the number of women employed as *recognised* midwives.

3.—The probability of being able to select and send from their own locality a woman capable of receiving such training, and willing afterwards to follow the vocation of nurse under the direction and supervision of the Clergy and Medical Practitioners, for the sole benefit of the sick poor of her own district, whose customs and habits she knows, and with whose wants she can best sympathize.

Persons so sent for training would be instructed gratuitously; but a sum would have to be provided or guaranteed sufficient to cover the cost of board, lodging, and washing in the Institution, during such training, also the expense of the journey to and from the Institution.

The time which such training would occupy cannot yet be exactly determined, probably a longer period would be necessary in some cases than in others; but this, with other points, would have careful consideration, and arrangements would be made, calculated as much as possible to facilitate a work believed to be of considerable social importance.

Communications may be addressed to

THE LADY SUPERINTENDENT OF ST. JOHN'S HOUSE,
At King's College Hospital,
London, W.C.

January, 1861.

PROSPECTUS

CF

KING'S COLLEGE, LONDON.

AUGUST 15, 1861.

INDEX.

	PAGE
THEOLOGICAL DEPARTMENT	3
DITTO (CLASS OF CANDIDATES FOR ADMISSION)	6
DEPARTMENT OF GENERAL LITERATURE AND SCIENCE	7
DEPARTMENT OF THE APPLIED SCIENCES. ENGINEERING SECTION	9
DITTO. DITTO. MILITARY SECTION	14
MEDICAL DEPARTMENT	15
WARNEFORD SCHOLARSHIPS	19
RESIDENCE OF STUDENTS	21
EVENING CLASSES	23
THE SCHOOL	28

FULLER PARTICULARS UPON ALL SUBJECTS CONNECTED WITH THIS COLLEGE MAY BE OBTAINED FROM THE "KING'S COLLEGE CALENDAR." THIS BOOK MAY BE PROCURED AT THE SECRETARY'S OFFICE, PRICE 2s. 6d.; OR IT WILL BE SENT BY POST, ON REMITTING THREE SHILLINGS IN STAMPS TO J. W. CUNNINGHAM, ESQ. KING'S COLLEGE, LONDON. W.C.

LONDON:

PRINTED BY R. CLAY, SON, AND TAYLOR, BREAD STREET HILL.

King's College, London.

PATRON.

HER MOST EXCELLENT MAJESTY THE QUEEN.

VISITOR.

HIS GRACE THE LORD ARCHBISHOP OF CANTERBURY.

OFFICIAL GOVERNORS.

THE RIGHT HON. THE LORD CHANCELLOR.
HIS GRACE THE LORD ARCHBISHOP OF YORK.
THE RIGHT HON. AND RIGHT REV. THE LORD BISHOP OF LONDON.
THE RIGHT HON. THE LORD CHIEF JUSTICE OF THE QUEEN'S BENCH.
THE RIGHT HON. THE SECRETARY OF STATE FOR THE HOME DEPARTMENT.
THE RIGHT HON. THE SPEAKER OF THE HOUSE OF COMMONS.
THE RIGHT HON. THE LORD MAYOR OF LONDON.
THE VERY REV. THE DEAN OF ST. PAUL'S.
THE VERY REV. THE DEAN OF WESTMINSTER.

LIFE GOVERNORS.

H. R. H. THE DUKE OF CAMBRIDGE, K.G.
THE MOST NOBLE THE MARQUESS OF CHOLMONDELEY.
THE RIGHT HON. THE EARL HOWE.
THE RIGHT HON. THE EARL OF HARROWBY.
THE LORD FEVERSHAM.
THE LORD CALTHORPE.
THE RIGHT HON. SIR JOHN PATTESON.
SIR BENJAMIN COLLINS BRODIE, BART.

THE COUNCIL.

THE GOVERNORS AND TREASURER.
THE RIGHT HON. THE EARL OF CARNARVON.
THE RIGHT REV. THE LORD BISHOP OF WINCHESTER.
THE RIGHT REV. THE LORD BISHOP OF LICHFIELD.
THE RIGHT REV. THE LORD BISHOP OF ROCHESTER.
THE RIGHT HON. LORD RADSTOCK.
RICHARD CLARKE, ESQ.
THE RIGHT HON. SIR J. T. COLERIDGE.
W. T. COPELAND, ESQ. M.P. ALDERMAN.
THE REV. CANON DALE, M.A.
THE RIGHT HON. W. E. GLADSTONE, M.P.
JOSEPH HENRY GREEN, ESQ. F.R.S.
REV. JOHN HAMPDEN GURNEY, M.A.
THE VENERABLE ARCHDEACON HARRISON.
THE REV. E. C. HAWTREY, D.D.
REV. J. G. LONSDALE, M.A.
SIR WILLIAM HEATHCOTE, BART. M.P.
CHARLES PARKER, ESQ.
SIR THOMAS PHILLIPS.
THE MASTER OF THE TEMPLE, D.D.
THOMAS GODFREY SAMBROOKE, ESQ.
C. P. SEROCOLD, ESQ.
THOMAS WATSON, ESQ. M.D.
EGERTON VERNON HARCOURT, ESQ.
EDWARD WIGRAM, ESQ.

TREASURER.

WILLIAM COTTON, ESQ.

PRINCIPAL.

REV. RICHARD WILLIAM JELF, D.D.

SECRETARY.

JOHN WILLIAM CUNNINGHAM, ESQ.

N.B.—The next day fixed for the Examination of Candidates for admission into this Department, in 1861, is Wednesday, October 2.

KING'S



COLLEGE,

LONDON.

Theological Department.

THE object in view in this Department of King's College is to provide a system of sound Theological Instruction, essentially practical in its nature, for the large and important class of young men who propose to offer themselves as Candidates for Holy Orders.

This department is under the immediate superintendence of the Principal of King's College, who lectures twice in each week on the 39 Articles, and is conducted by

The Rev. A. McCaul, D.D. . . .	{	Professor of the "Exegesis of the Old Testament."
		Professor of "Hebrew and Rabbinical Literature."
		Professor of "Ecclesiastical History."
The Very Rev. the DEAN of EXETER, B.D.	{	Professor of the "Exegesis of the New Testament."
The Rev. E. H. PLUMPTRE, M.A.		Professor of "Pastoral Theology."
The Rev. J. J. S. PEROWNE, M.A.	{	Lecturer in "Divinity," including "the Evidences."
		Lecturer in "Hebrew and Rabbinical Literature."
JOHN HULLAH, Esq.		Professor of "Vocal Music."
Rev. A. S. THELWALL, M.A. . . .		Lecturer in "Public Reading."

The superintendence of the Choir is entrusted to W. H. MONK, Esq.; and the lectures on Public Health are given by W. A. GUY, Esq. M.B. Cantab.

The course of Instruction in this Department embraces the Evidences of Natural and Revealed Religion; the Holy Scriptures in the Original Languages; the Thirty-nine Articles of Religion; the Book of Common Prayer; Ecclesiastical History, both Ancient and Modern; and the theory and practice of the Pastoral Office, including the reading of the Liturgy, and the composition and delivery of Sermons. Measures also are taken for providing the Students with the opportunity of acting as District Visitors under the Parochial Clergy, and also for enabling them to become practically acquainted with the best methods of conducting Schools. A course of eight Lectures on Public Health, in all its bearings, is given in the Lent Term of each year. Instruction is also given within the College in the theory and practice of Congregational Singing.

The following persons are admitted Students of this Department:—

1. All Students of King's College, London, who, having passed three years in the Department of General Literature and Science, and fulfilled the required conditions, shall have received the Diploma of an Associate.

2. All Graduates of the Universities of Oxford, Cambridge, and Durham.

3. All persons of the age of twenty-one, who, after having been examined and reported as eligible by the Principal, shall obtain the recommendation of a Bishop. The necessary qualifications are, the Four Gospels in Greek; a knowledge of the Historical Books of the Old Testament; a thorough acquaintance with the Church Catechism, with Scripture proofs; a* *grammatical* knowledge of some one Greek, and some one Latin Classical book, which may be selected by the Candidate himself; Latin and Greek Grammar; and Bacon's Essays. An acquaintance with a small pamphlet (Initia Hebraica) of four pages on the Hebrew Alphabet, by the Rev. A. M'Caul, D.D., is also expected; this may be purchased at the Secretary's Office, King's College, price 6*d.*, or by post 7*d.*

Associates of King's College, London, and Graduates of Oxford, Cambridge, or Durham, will be admitted on producing testimonials from their respective Colleges; and every other Candidate must send to the Principal, seven days previous to the examination, a written application for admission, accompanied by a certificate of good moral and religious character from the Clergyman of his parish, or of the parish in which he has last resided. The names of one or more friends to whom the Candidate is well known, must also be given as Referees. The form of application may be obtained by application to the Secretary.

Previously to Matriculation each Student must subscribe the Thirty-nine Articles of Religion, as well as a declaration that he will conform to all the rules and regulations of the College.

Persons already in Deacons' Orders, desirous of preparing themselves as Candidates for Priests' Orders, as well as Graduates of Oxford, Cambridge, and Durham, are permitted to attend the Theological Course for such length of time as they may desire; but, in the case of all other Students, the Course of Study must be continued during at least Six Academical Terms (two years). Examinations take place in each of the several branches of instruction every Term, and a probationary *vivâ voce* must be passed by every Student in his fourth or fifth Term. At the close of the course of two years a strict examination takes place; and to all Students who have merited such a distinction by their attainments, and by their good character during the period of their Studies in King's College, the Principal is empowered by the Council to grant a Certificate of attainments, which may be exhibited for the satisfaction of that Bishop to whom any Student may apply to be admitted as a Candidate for Holy Orders.

* The choice of books to be brought up is to be made from the following List:—

HOMER.—Books I. II. III.	CICERO.—“De Finibus.”
ONE GREEK TRAGEDY.	CÆSAR.—“De Bello Gallico.” Three Books.
HERODOTUS.—Book II., or any two other Books.	SALLUST.
THUCYDIDES.—One Book.	LIVY.—Two Books.
ZENOPHON.—“Cyropædia.” Books I. II. III.	TACITUS.—“De Moribus Germanorum,” and “Agricola.”
————— “Anabasis.” Books I. II. III.	VIRGIL.—Three Books of the <i>Æneid</i> , or the <i>Georgics</i> .
CICERO.—“De Officiis.”	HORACE.—The Odes; the Satires; or the Epistles.
————— “De Natura Deorum.”	

The two Archbishops and twenty-four of the Bishops have consented to admit as Candidates for Holy Orders those Students who shall produce the College Certificate. The Bishops of Bangor and Ely, *for local reasons only*, do not recognise the College Certificate.

The Board of Examiners hold examinations for Certificates at the *end* of the Michaelmas, Lent, and Easter Terms.

The Fees for attending the full prescribed Course are 8*l.* 8*s.* per Term for Graduates of Oxford, Cambridge, and Durham; 10*l.* 10*s.* per Term for all Associates of King's College, London; and 12*l.* 12*s.* per Term for all other Students. The Fees for the first two Terms must, except by special permission, be paid upon entrance, in addition to the following: viz.—

Matriculation Fees.....	}	£5 15 6
Library		
Cap and Gown.....		
The Calendar		

The Academical Year consists of Three Terms; viz.—

Michaelmas Term, from about the 1st of October to the week before Christmas.

Lent Term, from about the 20th of January to the week before Easter.

Easter Term, from about ten days after Easter to the end of June.

OCCASIONAL STUDENTS.

Gentlemen not wishing to attend the whole Course, may select any one or more subjects, at the following Fees:—

		Fees per Term.	Per Year.
		£ s. d.	£ s. d.
Ecclesiastical History.....	Rev. A. M'CAUL, D.D.....	4 4 0	10 10 0
Exegesis of the Old Testament and Hebrew	Rev. A. M'CAUL, D.D.....	4 4 0	10 10 0
Exegesis of the New Testament...			
Pastoral Theology and the Acts of the Apostles	The DEAN of EXETER, B.D.	4 4 0	10 10 0
Public Reading.....	Rev. E. H. PLUMPTRE, M.A.....	4 4 0	10 10 0
Vocal Music	Rev. A. S. THELWALL, M.A.....	2 2 0	5 5 0
Public Health	JOHN HULLAH, Esq.....	1 1 0	2 12 6
	W. A. GUY, Esq. M.B.	1 1 0	

RESIDENCE IN COLLEGE.

Residence is provided within the College precincts for a limited number of Students.

TERMS.—The amount to be paid for residence varies, according to the position of the rooms, from £50 to £60 per annum; in which amount is included the whole expense of, rent for furnished rooms, and attendance throughout the year; Coals, during the Michaelmas and Lent Terms; and Dinner in the College Hall, during the time that lectures continue. See page 21.

CLASS OF CANDIDATES FOR ADMISSION INTO THE THEOLOGICAL DEPARTMENT.

WITH the view of preparing those gentlemen who are not yet qualified to pass the examination for admission into the Theological Department, a Class is established, in which instruction in the Latin and Greek Languages is given daily. The elements of Hebrew are also taught.

Lecturer in Divinity.

Rev. ALEXANDER I. McCAUL, M.A.

Any person, twenty years of age, may enter this Class for such length of time as he may desire, upon producing a Certificate of good moral conduct from the Clergyman of the last place in which he has resided.

The instruction given varies according to the proficiency of each Student; but all Students of this Class are required to attend the Chaplain's Lecture on Thursday and Saturday.

Hours of attendance, from ten to two daily.

The Fees amount to £8 8s. per Term, which sum covers every expense, except the Entrance Fees, which are £5 15s. 6d., as in the Theological Department. Upon joining that Department, the Student will not have to pay the Entrance Fees again.

N.B. The next day fixed for the admission of new Students, in 1861, is Tuesday, October 1.

KING'S



COLLEGE,

LONDON.

Department of General Literature and Science.

This Department is intended to prepare Students for the Universities, for Holy Orders, for the Bar and other professions, and for competition for appointments in the Civil Service of her Majesty's Government, and of the Honourable East India Company.

The regular Course of Education comprises—

RELIGIOUS INSTRUCTION, according to the principles of the United Church of England and Ireland, by the Rev. R. W. JELF, D.D. Principal, and the Rev. E. H. PLUMPTRE, M.A. late Fellow of Brasenose College, Oxford.

THE GREEK AND LATIN CLASSICS, by the Rev. R. W. BROWNE, M.A. late Fellow and Tutor of St. John's College, Oxford, Professor; C. H. O. DANIEL, Esq. B.A. Scholar of Worcester College, Oxford, Lecturer; and the Rev. J. J. HEYWOOD, M.A. of Trinity College, Cambridge, Assistant Lecturer.

MATHEMATICS, by the Rev. T. G. HALL, M.A. late Fellow and Tutor of Magdalene College, Cambridge, Professor; the Rev. T. A. COCK, M.A. of Trinity College, Cambridge, Lecturer; and Rev. W. HOWSE, M.A. of St. John's College, Cambridge, Assistant Lecturer.

MODERN HISTORY, by C. H. PEARSON, Esq. M.A. Fellow of Oriel College, Oxford, Professor.

THE ENGLISH LANGUAGE AND LITERATURE, COMPOSITION, &c. by the Rev. J. S. BREWER, M.A. of Queen's College, Oxford, Professor.

FRENCH LITERATURE AND LANGUAGE, by ALPHONSE MARIETTE, M.A. Professor, and LÉONCE STIEVENARD, Lecturer.

GERMAN LITERATURE AND LANGUAGE, by ADOLPHUS BERNAYS, Ph.D. Professor.

The Fees for MATRICULATED Students, *i. e.* for those who are admitted to the regular and prescribed course of Study, amount to *III. 5s.* per term. The Fees for the first two terms are paid upon Matriculation, in addition to the following:—

Matriculation Fees.....	} £5 15 6
Library	
Cap and Gown	
The Calendar	

Previously to Matriculation, Students are required to produce a testimonial of good conduct from their last instructor, and to subscribe a declaration, that they will conform to all the Rules and Regulations of the College.

Except in special cases, no one is admitted under sixteen years of age.

Chapel.—The duties of the day commence with Prayers in the Chapel, at Ten o'Clock precisely. The presence of all Matriculated Students is required. A register of their attendance is kept.

The *Academical Year* consists of *Three Terms*; *viz.* *Michaelmas Term*, from the beginning of October to the week before Christmas; *Lent Term*, from the middle of January to the week before Easter; *Easter Term*, from Easter to the beginning of July.

Examinations.—There are Examinations at the end of the Michaelmas and Easter Terms when the Students are classed according to their proficiency. The Examination at the close of the Academical Year is followed by a public Distribution of Prizes.

SCHOLARSHIPS. The following are given every year in this Department:—

One of £50 every year, in Modern History.	} See next page.
One of £50 " in English Literature.	
One of £40 " in Classics, and one of £40 in Mathematics, for two years.	
One of £30 " " and one of £30 in ditto.	
One of £20 " " and one of £20 in ditto.	
One of £30 " in Divinity, (open to other Departments).	

Students who have pursued their Studies in this Department of the College for three years, and have fulfilled the required conditions, are entitled, under rules laid down in the Calendar, to the Diploma of "Associate of King's College." This privilege is also extended to all Students who have passed through a Course of *two years'* study at the College, if they have previously passed *two* years either in King's College School, or in one of the Schools in Union, and had passed at least one term in the highest form of that School before leaving it.

Students of this Department, who have obtained the Diploma of "Associate of King's College," are entitled to enter the Theological Department, with the view of becoming Candidates for Holy Orders.

Dinner is provided in the College Hall every day at 6 o'clock for such Students as may wish to avail themselves of that accommodation.

Residence of Students.—Rooms are provided within the walls of the College for the residence of a limited number of Matriculated Students. The Censor of the College lives within its walls, and to him is committed by the Council the superintendence of all resident Students under academical discipline. See page 21.

Some of the Professors, &c. receive Pupils into their houses. See p. 22.

The different Classes in this Department are likewise open to Gentlemen who, being unable to attend the whole course, may wish for the opportunity of studying any particular subject. The following are the Fees for admission to separate Courses:—

		Term.	Per Ann.
		£ s. d.	£ s. d.
Classical Literature	Profes. Rev. R. W. Browne	4 4 0	10 10 0
Mathematics	Profes. Rev. T. G. Hall	4 4 0	10 10 0
Modern History	Profes. C. H. Pearson	2 2 0	5 5 0
English Language, Composition, &c.	Prof. Rev. J. S. Brewer	2 2 0	5 5 0
Hebrew Language	Profes. Rev. A. M'Cauley, D.D.	2 2 0	5 5 0
Sanscrit, &c.	Profes. D. Forbes.	4 4 0	—
Modern Greek	G. W. Leitner, Esq.	4 4 0	10 10 0
Turkish		4 4 0	10 10 0
Arabic		4 4 0	10 10 0
French Language	Profes. Mariette	2 2 0	5 5 0
German Language	Profes. Bernays	2 2 0	5 5 0
Italian Language	Profes. Pistrucci	2 2 0	5 5 0
Spanish Language		2 2 0	5 5 0
Chinese Language	Profes. Summers	5 5 0	—
Drawing and Perspective	Professor De La Motte.	2 2 0*	5 5 0*
Law	Professor Stephen	4 4 0†	10 10 0†
Library Fee		—	1 1 0

* For Matriculated Students.

† For Occasional Students.

HOURS OF ATTENDANCE.

The duties of the day commence with prayers in the Chapel at Ten o'clock precisely, when the attendance of all Students is required.

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Classics	10½...1	10½...1	10½...1	10½...1	10½...1	—
Mathematics	—	—	—	—	—	—
Divinity	—	—	1½...2	—	—	10½...12½
English Language	1½...3½	1½...3½	—	1½...3½	1½...3½	—
Modern History	1½...3½	1½...3½	—	1½...3½	1½...3½	—
French	3½...4½	—	—	3½...4½	—	—
German	—	3½...4½	—	—	3½...4½	—
Hebrew	—	—	3...4	3...4	—	—
Italian	9...10	—	—	9...10	—	—
Chinese	—	3½...5	3½...5	—	3½...5	—
Modern Greek	—	3...4	—	3...4	—	—
Turkish	—	4...5	—	4...5	—	—
Arabic	—	5½...6½	—	5½...6½	—	—
Fencing	2...4	—	—	—	—	—
Landscape Drawing	8½...10	—	—	8½...10	—	—

*N.B. The next day fixed for the admission of new Students, in 1861, is
Tuesday, October 1.*

KING'S



COLLEGE,

LONDON.

Department of General Instruction in the Applied Sciences.

I.—ENGINEERING SECTION.

INCLUDING ENGINEERING, PRACTICAL SURVEYING AND LEVELLING, MANUFACTURING ART AND MACHINERY, &c.

THE object of this Section is to provide a system of general instruction, essentially practical in its nature, for the large and important class of young men hereafter to be engaged in Civil and Military Engineering, Surveying, Architecture, and the higher branches of Manufacturing Art.

The whole course thus occupies three years, and forms an appropriate introduction to that kind of instruction which can only be obtained within the walls of the manufactory, or by actually taking part in the labours of the Surveyor, the Engineer, or the Architect.

Museums, containing important and valuable collections, illustrating the subjects taught, are open to the Students.

Students who have passed two years in this Department, and, in addition, not less than one year in practice under a Civil or Mechanical Engineer, are, by a special order of the Secretary of State for India in Council, admitted to be Candidates for appointments to the Engineer Establishment in India.

The course of instruction comprises those branches of knowledge which form the groundwork of a liberal education. The following are the subjects taught in this Section:—

RELIGIOUS INSTRUCTION,

According to the principles of the United Church of England and Ireland, by the Chaplain the Rev. E. H. PLUMPTRE, M.A. late Fellow of Brasenose College, Oxford.

MATHEMATICS.

PROFESSOR—REV. T. G. HALL, M.A.

LECTURERS—REV. T. A. COCK, M.A., and REV. W. HOWSE, M.A.

FIRST YEAR.—Arithmetic; Algebra; Euclid, Books 1, 2, 3, 4, 6, 11; Plane Trigonometry and Logarithms.

SECOND YEAR.—Conic Sections; application of Algebra to Geometry; the Differential and Integral Calculus.

THIRD YEAR.—Spherical Trigonometry; Geometry of three dimensions; Differential Calculus.

NATURAL PHILOSOPHY AND ASTRONOMY.

PROFESSOR—JAMES CLERK MAXWELL, ESQ. M.A.

The object of these Lectures is to teach the principal Mechanical Sciences—namely, Statics, Dynamics, Hydrostatics, Pneumatics, and Hydraulics, together with Optics and Astronomy.

The instruction given in the first year requires no mathematical knowledge on the part of the Student, the method of solving problems by Construction being adopted.

In the second and third years the Mathematical principles of Mechanics, Hydrostatics, Optics, and Astronomy are taught, including the Theory of Work, the Mathematical Calculations relating to Roofs, Arches, Chain Bridges, Embankments, Strength of Materials, &c. together with the Constructions and use of Optical and Astronomical Instruments.

CHEMISTRY.

PROFESSOR OF CHEMISTRY—W. A. MILLER, M.D. F.R.S.

PROFESSOR OF PRACTICAL CHEMISTRY—C. L. BLOXAM, ESQ.

DEMONSTRATOR—E. A. HADOW, ESQ.

Students of the FIRST and SECOND YEARS are admitted to the Course of Theoretical and Applied Chemistry. The Course commences with a View of the Forces which concur

to the production of Chemical Phenomena, after which the laws of Chemical Affinity are discussed, and the Non-metallic Elements and their principal Compounds are described.

The Metals and their principal compounds are next examined, care being taken to point out the applications of the Science to the Arts; and the processes of the different Manufactures, of Metallurgy, and of Domestic Economy, are explained and illustrated.

Examinations of the Class, both *vivâ voce* and by written papers, are held at intervals during the course at the usual Lecture hour. Dr. Miller has published a work on Chemistry, which is used as a text-book by the Class.

THIRD YEAR.—Students who have completed six Terms in this Department are admitted to a Course of "Practical Chemistry," consisting of Twelve Demonstrations in each term; and they go through a course of Manipulation in the most important operations of Chemistry, including the first steps of Analysis.

Any Student of this Department may be admitted to this Class at any period of his study, on payment of an extra fee. See p. 12.

EXPERIMENTAL AND ANALYTICAL CHEMISTRY IN THE LABORATORY.—The object of this Class is to afford to Students who are desirous of acquiring a knowledge of analysis, or of prosecuting original research, an opportunity of doing so under the superintendence of the Professor and Demonstrator; Students may enter, upon payment of the extra Fees, at any time except during the vacation, and for a period of one, three, six or nine months, as may best suit their convenience. The laboratory hours are from ten till four daily, except Saturday, on which day the hours are from ten till one.

In addition to the Laboratory Fee, each Student defrays the expenses of his own Experiments. The amount of this expense, which is comparatively trifling, is entirely under his own control.

GEOLOGY.

PROFESSOR—JAMES TENNANT, Esq. F.G.S.

LENT TERM.—Descriptive Geology.

EASTER TERM.—The practical application of Geology to Engineering, Architecture, Agriculture, and Mining.

The Students are accompanied by the Professor to the Museum of Economic Geology, the British Museum, and other public institutions, and also on excursions into the country.

ARTS OF CONSTRUCTION IN CONNEXION WITH CIVIL ENGINEERING AND ARCHITECTURE.

PROFESSOR— ; **LECTURER**—ANDREW MOSELEY, Esq.

This Course, intended for Students of the second and third years, includes a descriptive account of the various Arts and Operations employed in Hydraulic Architecture or Engineering, and also of those employed in the ordinary practice of Civil Architecture;—Navigators', Bricklayers', Masons', Carpenters', Smiths' Work, &c.;—the matters acted upon,—the terms used,—the tools, implements, and materials employed, and the modes of operating with or upon them;—the combinations effected, and the modes of effecting them in detail;—Cutting and Embanking,—the Formation and Construction of Drains and Sewers, Shafts, Driftways, Tunnels, Canals, Reservoirs, Water Works, Roads, Bridges, Railways, Docks, Harbours, &c. &c.

The Course will also include Instruction in Specifying, Estimating, and Measuring Work, and in the practice of Architectural Surveying generally.

Any Student of this Department may be admitted to this class at any period of his study, on payment of the usual fee.

MANUFACTURING ART & MACHINERY.

PROFESSOR—C. P. B. SHELLEY, Esq.

The Lectures and Instructions in this section are intended to familiarize the student with the Machinery and contrivances in actual use; thus adding a knowledge of practice to the knowledge of theory taught by the Professors.

To effect this object, machines are not only described in general terms, but their various details, and the design of each particular construction, are explained and illustrated by drawings or models.

The most important manufacturing processes are also explained and amply illustrated in the course.

VISITS OF THE STUDENTS TO MANUFACTORIES, ETC.

Access to some of the principal Manufacturing Establishments in the metropolis, and its vicinity, having been liberally granted to the Students of this department of King's College, they are accustomed to visit them from time to time, accompanied by the Professor on Manufacturing Art and Machinery: they thus see in operation the manufacturing processes which have formed the subject of their Lectures, the mechanical expedients which concur to the production of each are explained, and the economy of the whole is pointed out on the spot.

ENGINEERING WORKSHOPS.

SUPERINTENDENT—G. A. TIMME, ESQ.

Workshops have been fitted up, with engines, lathes, forges, benches, and all necessary implements for enabling the Students to become practically familiar with the Use of Tools, and the Construction of Models. At certain hours the Students are admitted, and a regular course of instruction is given, beginning with the simplest kinds of work and gradually proceeding to the construction of models of Apparatus and Machinery.

In addition to the Superintendent, experienced workmen are in attendance at regular hours.

GEOMETRICAL DRAWING AND DESCRIPTIVE GEOMETRY.

PROFESSOR—THOMAS BRADLEY, ESQ.

LECTURER—FREDERICK ALFRED BRADLEY, ESQ.

This Course comprehends Practical Geometry in the most extensive sense of the term.

1. PLANE GEOMETRY, the delineation of plane figures and curves, and, generally, the solution of all the Problems required in the practical Arts; the use of Drawing Instruments, &c.

2. SOLID, or DESCRIPTIVE GEOMETRY, including PROJECTION, ISOMETRICAL PROJECTION, PERSPECTIVE, the construction of MAPS, LIGHT AND SHADE, and DRAWING, in the common acceptance of the term, as connected with the objects of this Department.

LANDSCAPE DRAWING AND COLOURING, AS APPLIED TO ARCHITECTURAL DESIGNS.

PROFESSOR—PHILIP H. DE LA MOTTE, ESQ. F.S.A.

This Class is limited to Students of the third year, who have the option of attending it *instead of* Geometrical Drawing.

MINERALOGY.

PROFESSOR—JAMES TENNANT, ESQ. F.G.S.

The Course commences with a description of the Physical and Chemical characters of Minerals in general.

The principal simple Minerals are next separately considered, and the readiest mode of distinguishing them described.

The course of instruction includes a minute description of all the substances entering into the composition of Rocks, and of those minerals which are also used in the Arts; illustrated by an extensive collection of characteristic specimens, and diagrams of the principal crystalline forms, &c.

PRACTICAL SURVEYING AND LEVELLING.

LECTURER—HENRY JAMES CASTLE, ESQ.

This Course is at once theoretical and practical: in the College, it embraces the various in-door details of a Surveyor's Office; and in the field, the uses and application of the several Surveying Instruments which are now in use on *Civil and Military* Surveys in England, India, and the colonies. It also includes the Theory and Practice of Levelling, the making of Sections from the Field-Books, and all the requisite practical detail before getting out the working drawings and letting the contracts; and generally, such information, both theoretical and practical, as will qualify the Student to enter at once as Draughtsman into an Engineer's Office.

Any Student of this Department admitted to this Class out of his regular turn, must pay the usual extra fee.

THE ART AND SCIENTIFIC PRINCIPLES OF PHOTOGRAPHY.

LECTURER—THOMAS SUTTON, ESQ. B.A.

Arrangements are now made for a complete Course of Instruction in Photography in King's College. A glass house, with commodious developing rooms, has been erected, and in connexion with it a Laboratory for the preparation of Photographic Chemicals. Students entering to this Department will be afforded every facility for practising the Art in all its branches.

In addition to the regular College Course in Photography, occasional Classes are formed, consisting each of about six gentlemen, who meet twice a week. Ten Lectures are given of two hours each, for which the fee is £3 3s., to be paid in the Office of the College. The fee for Private Instruction is £5 5s. for six lessons, or £10 10s. for perpetual attendance.

THE ADMISSION OF STUDENTS.

Previously to Matriculation, Students are required to produce a testimonial of good conduct from their last instructor, and to subscribe a declaration, that they will conform to all the Rules and Regulations of the College. Every Student, after obtaining the signature of the Principal to his card of admission, is required to bring it to Professor HALL, the Dean of this Department, in order that it may be countersigned by him.

CHAPEL.—All Matriculated Students are required to attend Prayers in the Chapel at 19 o'clock precisely. A register of their attendance is kept.

The Academical Year consists of *Three Terms*; viz. *Michaelmas Term*, from the beginning of October to the week before Christmas; *Lent Term*, from the middle of January to the week before Easter; *Easter Term*, from Easter to the beginning of July.

EXAMINATIONS.—One at the end of the Michaelmas Term and another at the close of the Academical Year, at which latter there is a public Distribution of Prizes.

AGE OF ADMISSION.—Except in special cases, no one is admitted under sixteen years of age.

RESIDENCE OF STUDENTS.—Rooms are provided within the walls of the College for the residence of a limited number of Matriculated Students. The Censor of the College lives within its walls, and to him is committed by the Council the superintendence of all resident Students under academical discipline. See page 21.

Some of the Professors, &c. receive Pupils into their houses. See page 22.

FEES.

The Fees payable by Matriculated Students, that is, by those who are admitted to the Regular and Prescribed Course of Study, amount to £12 17s. per Term. The Fees for the first two Terms must be paid upon entrance, in addition to the following:—

Matriculation Fees	} £5 15 6
Library	
Cap and Gown	
Calendar	

The different Classes in this Department are open to any Gentlemen who may not wish to attend the whole of the Course, but who may desire to study any particular subject. The following are the Fees:—

	£	s.	d.		£	s.	d.
Mathematics	4	4	0	per Term	10	10	0
Natural Philosophy	3	3	0	ditto	8	8	0
Chemistry	3	3	0	ditto	7	7	0
				for the Year.			
				1 11 6* } for Terminal Course of 12 demonstrations.			
				2 2 0 } for Summer Course of 30 demonstrations.			
				4 4 0\$ } for perpetual attendance.			
				5 5 0 } for perpetual attendance.			
				8 8 0\$ } for perpetual attendance.			
				9 9 0 } for perpetual attendance.			
Practical Chemistry	4	4	0	One Month.			
Experimental and Analytical Chemistry	10	10	0	Three Months.			
	18	18	0	Six months.			
	26	5	0	Nine Months.			
Descriptive Geology	2	12	6	for the Lent Term,	3	13	
Practical Geology and Mining	1	11	6	for the Easter Term, or			
Arts of Construction, &c.	2	12	6	per Term	7	7	0
Landscape Drawing	2	2	0\$	ditto	5	5	0\$
Mineralogy	4	4	0	ditto	10	10	0
Geometrical Drawing	2	2	0	per Term	2	2	0
Manufacturing Art and Machinery ..	2	2	0	ditto	5	5	0
Practical Surveying	3	3	0	ditto	8	8	0
Workshop†	3	3	0	ditto	8	8	0
Photography	3	3	0	for Ten Lessons.			

* For Students of this Department who have not kept six Terms.

§ For Matriculated Students of other Departments. || For Occasional Students.

A Fee of 14s. per Term is also required for the use of the Steam-engine and Machinery.

DAYS AND HOURS OF ATTENDANCE.

The duties of the day commence with prayers in the Chapel at Ten o'clock precisely, when the attendance of all Students is required.

	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>	<i>Saturday.</i>
FIRST YEAR.						
Chemistry.....	—	10.15—11.15	—	—	10.15—11.15	—
Mathematics	10.15—1	11.30—1	10.15—1	10.15—1	11.30—1	—
Mechanics and Nat. Phil.	10.15—1	—	10.15—1	10.15—1	—	—
Drawing	—	—	a1—4	—	1—4	—
Surveying.....	—	—	—	—	e3—4	e10
Mach. and Man. Art.....	—	—	—	1.15—2.15	—	—
Ditto, Visit	—	—	b1—4	—	—	—
Mineralogy (c).....	—	—	9—10	—	9—10	—
Geology (d)	—	—	9—10	—	9—10	—
Practical Geology (e).....	—	—	9—10	—	9—10	—
Workshop (h).....	1—4	1—4	—	—	—	—
Divinity.....	—	—	—	2.30—3.15	—	11
SECOND YEAR.						
Chemistry	—	10.15—11.15	—	—	10.15—11.15	—
Mathematics	10.15—1	11.30—1	10.15—1	10.15—1	11.30—1	—
Mechanics.....	10.15—1	—	10.15—1	10.15—1	—	—
Drawing	1—4	—	a1—4	—	—	—
Surveying	—	—	—	—	f1—5	g10
Mach. and Man. Art. (o).	—	1.15—2.15	—	—	—	—
Ditto, Visit	—	—	b1—4	—	—	—
Mineralogy (c).....	—	—	9—10	—	9—10	—
Geology (d)	—	—	9—10	—	9—10	—
Practical Geology (e).....	—	—	9—10	—	9—10	—
Arts of Construction (m).	—	4—5	—	3.30—4.30	—	—
Workshop (h)	—	1—4	—	—	1—4	g 10.15—1
Divinity.....	—	—	—	2.30—3.15	—	11
THIRD YEAR.						
<i>Extra Subjects.</i>						
Practical Chemistry (i n).	10.30—12.30	—	—	—	—	—
Photography (k n)	—	—	—	—	10.30—12.30	—
Surveying	—	—	—	—	f3—4	p10

As to other Classes, similar in all respects to Second Year Students.

a b. Alternate Wednesdays.

c. Michaelmas Term only.

d. Lent Term only.

e. Easter Term only.

f. Michaelmas and Lent Terms only.

g. On alternate Saturdays in Surveying during the Michaelmas and Lent Terms only.

h. Open from 1 to 6 daily (Saturday excepted, when it closes at 4), for such Students as have leisure for attending; but attendance required, and marked, at the hours named.

i. Twelve Lessons every Term.

k. Six Lessons every Term.

m. Open to Students of the First Year on payment of the usual fee.

n. Open to Students of the Second Year on payment of the usual fee, and by leave of the Dean.

o. Students not attending this Class on Tuesday, are to attend the Workshop from 1 to 4, and must also attend the lecture on machinery, at 1.15, on Thursday.

p. On alternate Saturdays in Levelling during the Michaelmas and Lent Terms only.

ENDOWMENTS, PRIZES, &c.

SCHOLARSHIPS.—One of £30, two of £25, and one of £20, tenable for one year.

The Divinity Scholarship of £30.

The Daniell Scholarship of £20. (See page 18.)

PRIZES, Certificates of Approval, and Certificates of Honour, are given to those Students who most distinguish themselves at the Examinations held in June.

ASSOCIATES, &c.—Students who have pursued their Studies in this Department for Nine Terms, and who have fulfilled the conditions mentioned in the Calendar, are entitled to the Diploma of "Associate of King's College."

MILITARY SECTION.

THIS Section of the Applied Sciences Department is intended—

A. FOR THOSE GENTLEMEN INTENDING, (1) TO COMPETE IN THE EXAMINATIONS FOR ADMISSION INTO THE ROYAL MILITARY ACADEMY AT WOOLWICH; THE ROYAL MILITARY COLLEGE AT ADDISCOMBE; OR THE ROYAL MILITARY COLLEGE AT SANDHURST: (2) OR TO PASS THE EXAMINATION FOR COMMISSIONS IN THE SERVICE OF HER MAJESTY, EITHER IN ENGLAND OR IN THE EAST INDIES.

B. FOR OFFICERS WISHING TO PREPARE THEMSELVES FOR THE EXAMINATION FOR STAFF APPOINTMENTS, OR TO COMPETE FOR ADMISSION INTO THE ROYAL MILITARY COLLEGE AT SANDHURST.

The different Classes are conducted by the following Professors and Lecturers:—

Religious Instruction, according to the principles of the United Church of England and Ireland, by the Rev. E. H. PLUMPTRE, M.A. Chaplain.

Mathematics, by the Rev. T. G. HALL, M.A. Professor, the Rev. T. A. COCK, M.A. Lecturer, and the Rev. W. HOWSE, M.A. Assistant Lecturer.

Chemistry, by Professor W. A. MILLER, M.D. Professor.

Natural Philosophy, by J. C. MAXWELL, Esq. M.A. Professor.

Mineralogy and Geology, by JAMES TENNANT, Esq. Professor.

Geometrical Drawing, by FREDERICK ALFRED BRADLEY, Esq. Lecturer.

Topographical Drawing; Fortification; Military Surveying; Military Law; the Science of Artillery, by MAJOR GRIFFITHS, R.A. Professor.

French, by PROFESSOR MARIETTE, M.A. Professor, and M. STIEVENARD, Lecturer.

Military Tutor (for History, Classics, &c.), REV. J. O'REILLY, M.A.

FEES AND HOURS OF ATTENDANCE.

Fees to Separate Classes per Term.		Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
£ s.							
2 2	Divinity	...	...	...	2.30—3.15	...	...
3 3	Mineralogy and Geology.	...	...	9—10	...	9—10	...
3 3	Chemistry	...	10.15—11.15	...	...	10.15—11.15	...
3 3	{Heat and Electricity} {(Natural Philosophy) ..}	10.15—1	...	10.15—1	10.15—1	...	...
4 4	Mathematics....{Pure.....} {Mixed ..}	10.15—1	11.30—1	10.15—1	10.15—1	11.30—1	...
2 2	Geometrical Drawing	1—3	...	1—4	...	1.15—4	...
4 4	{Topographical Drawing,} {Fortification, &c.....}	...	1.30—3.30	...	...	...	10.15—12.30
8 8	Ditto, for Officers only ...	...	11—3.30	...	...	...	10.15—2.30
2 2	French	3.15—4.45	...	...	3.15—4.45	...	...
4 4	{Military Tutor's Class in} {History, Classics, &c...}	...	...	3.15—5	1.15—2.15	2.30—4.30	...

Fees per Term to Matriculated Students, for the Course, including Tutor's Class, 15l. 15s. The Matriculation Fees are 5l. 15s. 6d. on entrance.

Fees for Officers' Class, 8l. 8s. per Term.

For further particulars apply to MAJOR GRIFFITHS.

KING'S



COLLEGE,

LONDON.

Medical Department.

THE Students received into this Department are—

I. Matriculated Students, or those who (with certain exceptions named in the Calendar) receive their entire medical education at King's College.

Matriculated Students alone have the privilege of filling the offices of Clinical Clerks, Dressers, Dentist's Assistant, Physicians' Assistant, Physician Accoucheur's Assistant, Assistant House Physician, House Surgeon, and Assistant House Surgeon, to the Hospital; of becoming candidates for the Warneford and Medical Scholarships; and of wearing the College cap and gown. They are also admitted to the practice of the Hospital at a somewhat reduced fee.

II. Occasional Students, or those who enter to one or more particular Classes. Every Class is open to such Students, on payment of the prescribed amount of fees.

The year is divided into two Sessions. The Winter Session, beginning October 1st, terminates at the end of March. The Summer Session, beginning May 1, terminates at the end of July.

The Lectures upon the various branches of Medical Knowledge are as follows:—

Winter Session.

ANATOMY, DESCRIPTIVE AND SURGICAL.	{	Professor, Rich. Partridge, F.R.S.
	{	Demonstrator, J. Wood, F.R.C.S.
	{	Assistant { W. F. Clarke, Demonstrators, { John Skrimshire, John Sherwin.
PHYSIOLOGY: GENERAL AND MORBID ANATOMY.....	{	Professor, Lionel Smith Beale, M.B. F.R.S.
CHEMISTRY	{	Professor, W. A. Miller, M.D. F.R.S. Demonstrator, E. A. Hadow, Esq.
MEDICINE, PRINCIPLES AND PRACTICE OF	{	Professor, George Budd, M.D. F.R.S.
SURGERY, PRINCIPLES AND PRACTICE OF	{	Professor, William Fergusson, F.R.S.

Summer Session.

BOTANY.....	Professor, Robert Bentley, F.L.S.
MATERIA MEDICA AND THERAPEUTICS...	Professor, George Johnson, M.D.
MIDWIFERY, AND THE DISEASES OF WOMEN AND CHILDREN.....	{ Professor, Arthur Farre, M.D. F.R.S.
FORENSIC MEDICINE.....	Professor, W. A. Guy, M.B. F.R.S.
PRACTICAL CHEMISTRY	Professor, C. L. Bloxam.
COMPARATIVE ANATOMY.....	Professor, T. Rymer Jones, F.R.S.
DENTAL SURGERY	Professor, Samuel Cartwright, jun. F.R.C.S.

Dean for the Year 1861-62 PROFESSOR MILLER, M.D.

Sub-Dean and Medical Tutor JOHN HARLEY, ESQ. M.B.

It is one of the duties of the Medical Tutor to assist the Students living in the College, as well as the non-resident Students, in the subjects of the Lectures of their first Winter and Summer Session.

N.B. By a recent regulation of the College of Surgeons, all candidates for the Diploma of the College, who shall commence their *Professional* Education on or after the 1st of January, 1861, will be required to pass a preliminary examination in the ordinary branches

of a liberal education, or to produce certificates from certain specified institutions of having passed a corresponding examination. For particulars see the Regulations of the Royal College of Surgeons, quoted in the Calendar.

Students who intend to graduate in the University of London are reminded that they will be required to pass the Matriculation Examination of that University at least two years before they can present themselves as candidates for any of its degrees. A certificate of having passed this examination, is admitted by the College of Surgeons and the Apothecaries Hall as a substitute for their own preliminary examinations.

ANALYTICAL AND EXPERIMENTAL CHEMISTRY.

Besides the Course of Chemical Lectures, and the Summer Class of Practical Chemistry, provision is made for those Students who wish to become more minutely acquainted with the practical details of the science. The Class formed for this purpose is conducted in the Laboratory, under the superintendence of the Professors and Demonstrator. By this means each Student will be enabled to familiarize himself with the methods of analysis and research. After passing through a preliminary course of analytical operations, each Student devotes himself to such portions of the science as are most interesting to himself, or most likely to be practically useful to him.

DENTAL SURGERY.

A Course of Lectures on Dental Physiology, Dental Surgery, and Pathology, and on Dental Mechanics, will be given during the Summer Session for those who specially enter for this Course.

Special Certificates of attendance on the Dental Practice of the Hospital will be given on payment of an extra Fee of Five Guineas.

Fees.

The College fees, in the case of *Matriculated* Students, for the lectures required by the College of Surgeons and the Society of Apothecaries, amount to 61*l.* 19*s.*; those for Hospital practice to 31*l.* 10*s.*; those for Matriculation, (including Library Fee, Calendar, and College Cap and Gown,) to 5*l.* 15*s.* 6*d.*; making together 99*l.* 4*s.* 6*d.* This sum will cover all that of necessity *must* be paid for the entire three years' Course of Study.

Students are, however, recommended to add to this sum 2*l.* 2*s.* for a second Course of Chemistry, as well as the Fee for attendance on the Medical Tutor's Class for one year; viz. 3*l.* 3*s.* All resident Students are required to attend the Tutor during their first year.

The fees may be paid either in one sum on Matriculation, or in two equal sums; the one at the commencement of the first Winter or Summer Session, the other, after the first Christmas vacation, not later than Jan. 21st, unless other arrangements are made at the time of entrance.

If the plan here suggested is carried out, the following will be the mode of payment.

In October.	First half of the Medical Fees	£32	0	6	
„	First Half of the Hospital Fees.....	15	15	0	
„	Medical Tutor, One Year.....	3	3	0	
„	Matriculation Fees.....	5	15	6	
					56 14 0
In January.	Second half of Medical Fees	32	0	6	
„	Second half of Hospital Fees	15	15	0	
					47 15 6
Total amount necessary to defray the cost of Lectures required by the College of Surgeons and the Society of Apothecaries, together with a Second Course of Chemistry and the Tutor's Fees for One Year					£104 9 6

Should any one prefer entering at once as a *perpetual Student to every Course of Instruction* given in this Department (except the Laboratories and Dental Surgery) the charge will be as follows:—

In October.	First half of Medical Fees.....	£38	6	6	
„	First half of Hospital Fees	15	15	0	
„	Medical Tutor, One Year.....	3	3	0	
„	Matriculation	5	15	6	
					63 0 0
In January.	Second half of Medical Fees	38	6	6	
„	Second half of Hospital Fees.....	15	15	0	
					54 1 6
Total amount necessary to defray the cost of entering, as a <i>Perpetual Student</i> , to every Course of Instruction given in this Department, except as above.					£117 1 6

The Fees for admission to the Laboratory Class are, for one month, 4*l.* 4*s.*; for three months, 10*l.* 10*s.*; for six months, 18*l.* 18*s.* &c.

Days and Hours of Attendance.

CLASS.	M.	Tu.	W.	Th.	F.	S.	HOURS.	Fee for the Sessional Course.	Fee for Unlimited Attendance.
WINTER SESSION.									
Anatomy.....	—	—	—	—	—	*	9 — 10 A M.	£6 6 0	£9 9 0
Chemistry.....	—	—	—	—	—	—	10½ — 11½	7 7 0	9 9 0
Physiology.....	—	—	—	—	—	—	4 — 5	6 6 0	9 9 0
Medicine.....	—	—	—	—	—	—	4 — 5	7 7 0	7 7 0
Surgery.....	—	—	—	—	—	—	5 — 6	5 5 0	7 7 0
The Chaplain's Lecture.....	—	—	—	—	—	—	10½ — 11		
† Tutor's Class.....	—	—	—	—	—	—	3 — 4	3 3 0	
	—	—	—	—	—	—	5 — 6		
SUMMER SESSION.									
Midwifery.....	—	—	—	—	—	—	9 — 10	6 6 0	6 6 0
Comparative Anatomy.....	—	—	—	—	—	—	12 — 1	3 3 0	4 4 0
Botany.....	—	—	—	—	—	—	12½ — 1½	3 3 0	4 4 0
† Practical Chemistry.....	—	—	—	—	—	—	10½ — 12	1½ 4 0	13 8 0
Forensic Medicine.....	—	—	—	—	—	—	3 — 4	3 3 0	4 4 0
Materia Medica.....	—	—	—	—	—	—	8 — 9	4 4 0	6 6 0
Morbid Anatomy.....	—	—	—	—	—	—	4 — 5	2 2 0	
Dental Surgery.....	—	—	—	—	—	—	9 — 10	6 6 0	8 8 0
† Tutor's Class.....	—	—	—	—	—	—	9 — 10	3 3 0	
BOTH SESSIONS.									
Chapel.....	—	—	—	—	—	—	10		
The Principal's Lecture.....	—	—	—	—	—	—	1½ — 2		

* Anatomy of the head and Neck. See Reg. of Coll. of Surg. for Dent. Surg.

† Half the Class attends three days alternately.

‡ To Matriculated Students.

King's College Hospital.

Consulting Physicians. {Thos. Watson, M.D. F.R.S.
{Robert Ferguson, M.D.Assistant-Physicians {Conway Evans, M.D.
Alfred B. Duffin, M.D.
E. Symes Thompson, M.D.
E. Liveing, M.D. } With care of Out-Patients.Physicians. {George Budd, M.D. F.R.S. } With care of
George Johnson, M.D. } of
Lionel S. Beale, M.B. F.R.S. } In-Patients.{W. A. Guy, M.B. F.S.S. } With care of
Out-Patients.{Arthur Farre, M.D. F.R.S. } For Diseases of
Women and Children, and
Physician-Accoucheur.Surgeons. {W. Fergusson, F.R.S.
Riehd. Partridge, F.R.S.
Wm. Bowman, F.R.S. } With care of In-patients.Assistant-Surgeons. {John Wood, F.R.C.S.
John W. Hulke, F.R.C.S. } With care of
Henry Smith, F.R.C.S. } Out-patients.
P. C. Price, M.R.C.S.

Surgeon-Dentist. {S. Cartwright, jun. F.R.C.S.

The Resident Medical Officers, Clinical Clerks, Dressers, &c. are selected by examination from among those Matriculated Students of the College who are Pupils of the Hospital. No Fee is paid for any of these appointments.

DAYS AND HOURS OF ATTENDANCE.

	M.	Tu.	W.	Th.	F.	S.	HOURS.	CLINICAL LECTURE.
Dr. Budd.....	—	—	—	—	—	—	1½ p.m.	Every alt. Monday at 1½ p.m.
Dr. Johnson.....	—	—	—	—	—	—	1½ p.m.	Every alt. Tuesday at 1½ p.m.
Dr. Beale.....	—	—	—	—	—	—	9 a.m.	Every Saturday at 9 a.m.
Dr. Arthur Farre.....	—	—	—	—	—	—	12½ p.m.	
Dr. Guy.....	—	—	—	—	—	—	1 p.m.	
Dr. Evans (Winter Sess. only).....	—	—	—	—	—	—	1 p.m.	
Dr. Duffin.....	—	—	—	—	—	—	1 p.m.	
Dr. Thompson.....	—	—	—	—	—	—	1 p.m.	
Dr. Liveing.....	—	—	—	—	—	—	1 p.m.	
Dr. Tanner (Sum. Sess. only).....	—	—	—	—	—	—	12½ p.m.	
Dr. Meadows (Winter Sess. only).....	—	—	—	—	—	—	12½ p.m.	
Professor Fergusson.....	—	—	—	—	—	—	1½ p.m.	Every alt. Thursday at 1½ p.m.
Professor Partridge.....	—	—	—	—	—	—	1½ p.m.	Every alt. Friday at 1½ p.m.
Mr. Bowman.....	—	—	—	—	—	—	9 a.m.	
Mr. Smith.....	—	—	—	—	—	—	1 p.m.	
Mr. Price.....	—	—	—	—	—	—	1 p.m.	
Mr. Hulke (Winter Sess. only).....	—	—	—	—	—	—	1 p.m.	
Mr. Wood (Sum. Sess. only).....	—	—	—	—	—	—	1 p.m.	
Mr. Cartwright.....	—	—	—	—	—	—	10 a.m.	
Vaccination.....	—	—	—	—	—	—	10 a.m.	

F E E S.

Perpetual Admission to the Medical and Surgical Practice:—

For Matriculated Students..... £31 10 0

For those not Matriculated..... 36 15 0

Medical Practice:—

Three Months..... 6 6 0

Six Months..... 10 10 0

Eighteen Months..... 15 15 0

Perpetual..... 21 0 0

Surgical Practice:—

Three Months..... 10 10 0

Six Months..... 15 15 0

Twenty-one Months..... 21 0 0

Perpetual..... 26 5 0

Scholarships.

A. WARNEFORD SCHOLARSHIPS.—The sum of 200*l.* is set apart annually, in consideration of 5,000*l.* presented to the College by the late Rev. S. W. Warneford, LL.D., for Scholarships to Matriculated Students of this Department, viz.—

Class I.—“For the encouragement of the previous education of Medical Students.” Two Scholarships of 25*l.* per annum, for three years.

Class II.—“For the encouragement of resident Medical Students.” One Scholarship of 25*l.* per annum for two years.

B. COLLEGE SCHOLARSHIPS.—The following are given every year to Matriculated Students of this Department:—

1. One of 40*l.* for two years, open to Students of the third and fourth year.

2. One of 30*l.* for one year, open to Students of the second year.

3. Three of 20*l.* for one year, open to Students of the first year.

C. DANIELL SCHOLARSHIP.—This Scholarship was founded in honour of the late Professor Daniell, and is open to every Student of the College, whether matriculated or occasional, who has worked in the Laboratory for at least six months. It is of the annual value of 20*l.*, tenable for two years.

D. DIVINITY SCHOLARSHIP.—This Scholarship of 30*l.* is also open to Matriculated Students of this Department.

Prizes.

A. LEATHES' PRIZES.—The Interest of 300*l.* bequeathed by the late P. H. Leathes, Esq., is applied in the purchase of a Bible and Prayer-book, as Annual Prizes to two Matriculated Medical Students.

B. WARNEFORD PRIZES.—The sum of 40*l.* is set apart annually in consideration of 1,000*l.* presented to the College by the late Rev. S. W. Warneford, LL.D., and is expended in the purchase of Medals and Books, as Prizes to two Matriculated Medical Students.

C. CLASS PRIZES are awarded annually for proficiency in the several subjects of Anatomy, Physiology, Chemistry, Materia Medica, Surgery, Medicine, Midwifery, Botany, Forensic Medicine, Comparative Anatomy, and Practical Chemistry. These consist of Books of the value of 3*l.*

Certificates of Honour are given to such Students in each class as the respective Professors shall consider entitled to receive them.

Two Medical Clinical Prizes, one of 3*l.* for the Winter Session, and the other of 2*l.* for the Summer Session; and two Surgical Clinical Prizes of the same value, are given also for the encouragement of diligence in attendance at the Hospital.

All Students, *Occasional* as well as *Matriculated*, will be admitted to contend for the Class Prizes **C**, under rules laid down as to the number of Courses of Lectures. For particulars of all these Prizes see Calendar.

ASSOCIATES OF KING'S COLLEGE.—At the end of each Winter Session, the Professors lay before the Council the names of those Medical Students whom they recommend to be elected Associates of King's College, London. See the College Calendar. Application to be made to the Sub-Dean of the Medical Department, in writing, previous to the 31st of March in each year.

DEGREES.—Students of this College are admitted to Degrees in Arts and Medicine, and for the Honours, Exhibitions, and Scholarships conferred by the Senate of the University of London.

By a regulation of the University of Edinburgh, three out of the four years of study required by that University for its degree of M.D. may be passed at King's College.

RESIDENCE OF STUDENTS.—Rooms are provided within the walls of the College for the residence of a limited number of Matriculated Students. See page 21.

Some of the Professors, &c. receive Pupils into their houses. The Council have also sanctioned a limited number of Medical Gentlemen, residing in London or its immediate neighbourhood, to receive Pupils into their houses. See page 22.

The Parents or Guardians of Students are earnestly requested to communicate with the Dean of the Medical Department before fixing their place of residence.

DINING HALL.—There is a Dining Hall in the College, for the accommodation of the resident Students, and for such other Students as may desire to avail themselves of it.

The Sub-Dean of the Medical Department attends daily at King's College, London, from 10 A.M. to 12, for the purpose of seeing Students and their friends. Any letter addressed to him on the subject of this Department, will receive early attention.

R U L E S

FOR THE

WARNEFORD SCHOLARSHIPS.

THE Council hereby give notice, that the following will be the Rules under which Scholars on these Foundations will be elected—

CLASS I.

FOR THE

Encouragement of the previous Education of Medical Students.

TWO SCHOLARSHIPS, of the value of £25 per annum each, to be held for three years, and THREE SCHOLARSHIPS, of the value of £25 per annum each, to be held for two years, will be given in October, 1861, subject to the provisions hereafter stated.

Candidates must be Matriculated Students of the Medical Department, and also perpetual Pupils of the Hospital.

Their first Winter Session must commence in October, 1861.

The Examination will be in the following subjects :—

1. DIVINITY.—The Book of Genesis. The Gospel according to St. Matthew, in Greek. The Church Catechism, with Scripture proofs.

2. THE GREEK AND LATIN CLASSICS.—Xenophon, Memorabilia, Book I.; Ovid, Metamorphosis, Book XIII.; Heroides, Epistola X., Ariadne Theseo.

3. ENGLISH LANGUAGE AND HISTORY.—Burke on the French Revolution. The reign of Queen Elizabeth.

4. MATHEMATICS.—Arithmetic; Algebra, as far as Quadratic Equations; Euclid Book I.; Book II. except Props. 8, 9, 10; Book III.

5. THE MODERN LANGUAGES.—French: De la grandeur et de la décadence des Romains, par Montesquieu. German: Kugler's Geschichte Friedrichs des Grossen.

An equal number of marks is assigned to each of the five subjects. A want of sufficient knowledge in Divinity absolutely disqualifies from further examination; but candidates may omit any other subjects which they think proper.

These Scholarships may be held for three or for two years respectively, provided the Scholar continues so long attending Lectures in the Medical Department at King's College, and provided he shall produce to the Council, at the close of his First and Second Academical Year respectively, a Certificate signed by the Principal, the Chaplain, and the Dean of the Medical Department, (1) of good conduct; (2) of regular attendance on the daily Chapel Service, and (3) the Divinity Lectures; and (4) of satisfactory progress in his Religious and Medical studies during the year then past. The Scholarship will become void at the close of the Academical Year in which such Certificate is not obtained.

For further particulars respecting the Examination, &c. for these Scholarships, see the King's College Calendar.

The days of Examination for 1861 are fixed as follows:—

Saturday, September 28 :—

10 to 3. DIVINITY.	{	1½ hour to each of the three subjects, with short intermissions.
--------------------	---	--

Monday, September 30 :—

9 to 11. LATIN.	
11½ to 1½. GREEK.	
3 to 5. FRENCH.	

Tuesday, October 1 :—

9 to 2. MATHEMATICS.	{	1½ hour to each of the three subjects with short intermissions.
----------------------	---	---

Wednesday, October 2 :—

9 to 11. HISTORY.	
11½ to 1½. ENGLISH LITERATURE.	
3 to 5. GERMAN.	

CLASS II.

FOR THE

Encouragement of Resident Medical Students.

ONE SCHOLARSHIP will be awarded at the close of the month of July, 1861, of the value of £25 per annum, to be held for two years, subject to the provisions hereafter stated.

This Scholarship is open to all *Second Year* Matriculated Students of the Medical Department, being also perpetual Pupils of the Hospital, who during

At least Six Months of their First Academical Year, }
and the } have
Whole of their Second Academical Year, }

resided within the limits of the College, and who produce to the Principal the following certificates; viz. (1) of good conduct from the Censor, or from the Physician or Surgeon with whom he has been residing; (2) of regular attendance on the Sunday and daily Chapel Service, and (3) on the Divinity Lectures, from the Chaplain; and (4) of satisfactory attention to the regular Medical studies, from the Dean of the Department.

The Examination for 1862 will be in the following subjects:—

I. Divinity:—

1. The Two Books of SAMUEL.
2. The EPISTLE OF ST. JAMES.
3. BUTLER'S ANALOGY, Part I. Ch. i. iii. vii
4. THE THIRTY-NINE ARTICLES, Art. vii. viii. ix.

II. Candidates will be required, at the time of examination,

1. To write from memory the particulars of four cases which shall have been treated in the Hospital during the previous Academical Year. Each Candidate may select his own cases; but no two cases selected by him may be taken from the practice of the same Physician or Surgeon.
2. To give, in writing, with the aid of notes taken by himself at the time, the substance of four of the Clinical Lectures which shall have been delivered in the Hospital by the Medical Officers thereof during the previous Academical Year. The Lectures to be selected by the Examiners.
3. To answer, either *viva voce*, or in writing, as the Examiners may direct, four questions on cases which shall have occurred or been treated within the Hospital in the practice of the Physicians and Surgeons thereof, in the current Session.

N.B. Candidates who have been holding Hospital Appointments in the year preceding the Examination, have the liberty of stating, at the time they give in their names, which of the two Physicians and which of the two Surgeons they have had the opportunity of attending, and they will be examined only in the Clinical Lectures and Clinical Teaching given by such Physician and Surgeon.

An equal number of marks is assigned to each of the two great divisions of the Examination; viz. Divinity and Hospital Practice; but a want of sufficient knowledge in Divinity absolutely disqualifies from further examination.

These Scholarships are tenable only so long as the Scholar continues to attend Lectures in the Medical Department, and to reside within the limits of the College; unless, previously to the expiration of the two years for which the Scholarship is tenable, the Scholar have passed the necessary examinations required by the College of Surgeons and the Society of Apothecaries, or have been excused from further residence by the Council of King's College, for any cause that may to them seem reasonable: provided also that, at the close of his Third Academical Year, each Scholar on this Foundation shall produce to the Council a certificate, signed by the Principal, the Chaplain, and the Censor of the College, and by the Dean of the Medical Department, (1) of good conduct; (2) of regular attendance on the Sunday and daily Chapel Service, and (3) on the Divinity Lectures; and (4) of satisfactory progress in his Religious and Medical studies during the year then past. Unless such Certificate is produced, the Scholarship will become void at the close of that Academical Year.

Residence of Students.

Rooms are provided within the walls of the College, for the residence of a limited number of Matriculated Students.

The Censor of the College, the Rev. J. J. S. Perowne, M.A., Fellow of Corpus Christi College, Cambridge, lives within its walls, and to him is committed by the Council the superintendence of all resident Students.

TERMS AND RULES AS TO PAYMENT.

				Academical Year.	Winter Session.	Summer Session.	Single Term.
				£	£ s. d.	£ s. d.	£
No. 1.	Sitting-room and Bed-room separate			60	45 0 0	20 0 0	22
2.	Ditto ditto ditto			55	41 5 0	18 6 8	20
3.	Ditto ditto in one.....			50	37 10 0	16 13 4	18
4.	Ditto ditto ditto			50	37 10 0	16 13 4	18
5.	Ditto ditto separate.....			60	45 0 0	20 0 0	22
6.	Ditto ditto ditto			60	45 0 0	20 0 0	22
7.	Ditto ditto in one.....			50	37 10 0	16 13 4	18
8.	Ditto ditto ditto			50	37 10 0	16 13 4	18
9.	Ditto ditto separate.....			60	45 0 0	20 0 0	22
10.	Ditto ditto ditto			60	45 0 0	20 0 0	22
11.	Ditto ditto in one.....			50	37 10 0	16 13 4	18
12.	Ditto ditto ditto			50	37 10 0	16 13 4	18
13.	Ditto ditto separate.....			55	41 5 0	18 6 8	20
14.	Ditto ditto ditto			60	45 0 0	20 0 0	22
18.	Ditto ditto in one.....			50	37 10 0	16 13 4	18
19.	Ditto ditto separate.....			60	45 0 0	20 0 0	22
20.	Ditto ditto ditto			55	41 5 0	18 6 8	20
21.	Ditto ditto ditto			50	37 10 0	16 13 4	18
22.	Ditto ditto ditto			60	45 0 0	20 0 0	22
23.	Ditto ditto ditto			60	45 0 0	20 0 0	22
24.	Ditto ditto ditto			55	41 5 0	18 6 8	20
25.	Ditto ditto ditto			50	37 10 0	16 13 4	18
26.	Ditto ditto ditto			60	45 0 0	20 0 0	22
27.	Ditto ditto ditto			60	45 0 0	20 0 0	22
28.	Ditto ditto ditto			55	41 5 0	18 6 8	20
29.	Ditto ditto ditto			50	37 10 0	16 13 4	18

In these amounts are included the *whole* expenses of Rent for Furnished Rooms, Attendance during the Academical Year, Coals during the Michaelmas and Lent terms or the Winter Session, and of Dinner in the College Hall during the time that Lectures continue.

Students have to bring their own linen, and to find their own cups and saucers, &c. for their rooms. These articles, however, as well as bread, butter, tea, sugar, &c. for breakfast, can be obtained through the Manciple of the College, at fixed prices.

All Students, not belonging to the Medical Department, must take rooms for at least two terms upon first coming to reside. Medical Students taking rooms in October, must engage them for the whole Winter Session. The amount may be paid in full upon entrance; or one-half upon entrance, and the remainder at the beginning of the second division of the Session, and not later than January 21. A Student will not be allowed the benefit of the reduction made to those who take rooms for the whole year, unless he declares this to be his intention upon entrance. In this case he will be required to pay *the whole of the Fees for the year* upon entrance, or in two portions, as before mentioned.

Three months' notice is to be given of the intention of any Student to give up his rooms.

In the event of any vacancy occurring, Students will have the preference of changing their rooms according to length of residence in College. Three days' notice will be given in the College Hall of vacancies as they occur.

All fees are payable in advance.

RULES FOR THE GUIDANCE OF RESIDENT STUDENTS.

Quiet, order, decorum, and peaceful conduct must be strictly observed.

Each Student is required to be at home by Ten o'Clock at night, unless absent by leave of the Censor.

No person can be allowed to enter the College for the purpose of visiting a Student after Ten o'Clock.

Friends visiting Students are required to leave the College before Eleven o'Clock. In case of this rule being under any circumstances infringed, the Student must accompany his friends to the gate, and enter his own and their names, together with their address, in a book kept for the purpose by the Porter. Each Student is held responsible for the orderly and quiet conduct of all friends while leaving his rooms, as well as during their visit there.

Resident Students must dine in the College Hall (in their academical dress) every day, except when absent by leave of the Censor.

Names of Gentlemen authorized by the Council to receive Medical Students into their houses as Boarders, under rules laid down by the Council for their guidance.

JOHN WOOD, Esq. Demonstrator of Anatomy, 4, Montague Street, Russell Square.

W. B. GILL, Esq. M.D. 5, Cambridge Place, Albany Street.

C. HOLTHOUSE, Esq. 9, New Burlington Street.

H. HYDE SALTER, Esq. M.D. 6, Montague Street, Russell Square.

KING'S



COLLEGE,

LONDON.

Evening Classes.

1. CLASSES for Evening Instruction are held at King's College during the months from October to March, inclusive, and during the months of April, May, and June.

2. The Winter Course for 1861-2 will commence on Monday, October 14, and will terminate on Friday, March 28, the last fortnight being devoted to examinations.

There will be a Vacation of four weeks at Christmas, commencing from after Friday, December 20, 1861.

The Second Half of the Winter Session will begin on Monday, January 20, 1862.

The Summer Course for 1862 will commence on Monday, April 28, and will continue till the end of June.

3. The following are the subjects of the Winter Course :—

1. DIVINITY.
2. LATIN. (Four Classes.)
3. GREEK. (Three Classes.)
4. FRENCH. (Six Classes.)
5. GERMAN. (Four Classes.)
6. ITALIAN. (Two Classes.)
7. ENGLISH LANGUAGE AND COMPOSITION. (Four Classes.)
8. ANGLO-SAXON.
9. HISTORY
10. GEOGRAPHY } OF ENGLAND.
11. ARITHMETIC AND BOOK-KEEPING.
12. MATHEMATICS (including Algebra, Euclid, Trigonometry, Differential and Integral Calculus). (Six Classes.)
13. THE PRINCIPLES OF COMMERCE AND COMMERCIAL LAW.
14. DRAWING. (Landscape, Figure, Model, and Architectural.)
15. THE ELEMENTS OF CHEMISTRY.
16. MECHANICS.
17. PHYSIOLOGY.
18. BOTANY.
19. EXPERIMENTAL PHYSICS.
20. SPANISH.
21. DUTCH.
22. ZOOLOGY.

Many of these Classes have special reference to the B.A. and Matriculation Examinations at the University of London.

If any number of Gentlemen, not less than Ten, shall wish for instruction in

any other subject, such as Hebrew, Mineralogy, &c. arrangements will be made (if possible) to meet their wishes.

4. The following are the Fees for the Winter Session:—

- (1.) For any single Course (except Divinity), £1 11s. 6d. For the Divinity Class only, 10s. 6d.
- (2.) The Divinity Class is free to all Students attending any other Class.
- (3.) For any four Classes £5 5s. For five Classes £6 11s. 3d.
- (4.) In the case of several Gentlemen entering from one Firm or Company, the following will be the fees:—

	For any single Course.		For any four Classes.	
If more than five in number,	£1	6 3	each person.	£4 7 6
If more than ten in number,	1	1 0	„	3 10 0

5. After Christmas, the Fee is reduced to £1 1s. for One Class; and to £3 10s. for Four Classes. The Fees for the Summer Course are the same.

6. Students of this Department have the privilege of becoming “Matriculated Students of King’s College, London,” by payment of an additional fee of £3 11s. This includes the cost of the College Cap and Gown. Students who matriculate in any one year are retained on the list of Matriculated Students in subsequent years, provided they enter to at least two classes.

7. All Fees to be paid upon entrance. It is important to the College authorities that the entries for each Session should, as far as possible, be made a few days before the day fixed for the commencement of the course, in order that the necessary arrangements as to Lecturers and Lecture-rooms may be properly made; but Students may enter at any time during the Course.

8. A Letter of Introduction, from the Clergyman of the District, from the Student’s Employer or the Head of his office, or from some other known person, is, in every case, required upon entrance.

9. The following is the Time Table for the next Winter Course:—

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
6		*Mathematics.			*Mathematics.
to	Mechanics.	*English.		Mechanics.	*English.
7		*Italian.			*Italian.
7		*Mathematics.			*Mathematics.
to	Latin.	*English.		Latin.	*English.
8	Commerce.	Anglo-Saxon.	†Divinity.	Commerce.	*Italian.
	*German.	*Italian.		*German.	*French.
	Chemistry.	*French.		Chemistry.	Drawing.
		Drawing.			
8		*French.			*French.
to	Greek.	History.	Exp. Sciences.	Greek.	
9	*German.	Anglo-Saxon.	Physiology.	*German.	Geography.
	Arithmetic.	Spanish.		Arithmetic.	
	Dutch.			Dutch.	
	Botany.			Zoology.	Spanish.

* Students in these subjects may attend either hour on the two appointed evenings; or may take their two hours on one evening; or by the payment of an additional sum of £1 1s. (14s. after Christmas) may attend both hours on both evenings.

† Matriculated Students are required (unless specially exempted) to attend Divinity Class on Wednesday Evening.

10. The Library of the College is open for the purposes of study to all German joining any of these Classes, from 5.30 to 8, every Monday, Tuesday, Thursday and Friday, without additional fee.

Associates and Students of the regular Departments of the College are admitted to the Library, during the evening, on payment of 10s. 6d. each.

11. Names of the Gentlemen who give instruction in these Classes:—

1. *Divinity* Rev. Professor PLUMPTRE, M.A.
2. *Latin* { Rev. C. U. DASENT, M.A.
Rev. A. I. MC CAUL, B.A.
JOHN LAMB, Esq.
Rev. W. HOWSE, M.A.
3. *Greek* { C. H. O. DANIEL, Esq. B.A.
Rev. A. I. MC CAUL, B.A.
JOHN LAMB, Esq.
4. *French* { Professor MARIETTE, M.A.
MONS. STIEVENARD,
MONS. THIBAUDIN,
MONS. ISNARD.
5. *German* { Rev. Dr. WINTZER,
Herr SCHNEIDER.
6. *Italian* Professor PISTRUCCI.
7. *English Language and Composition* { HENRY MORLEY, Esq. A.K.C.
REV. O. ADOLPHUS, M.A.
8. *Anglo-Saxon* HENRY MORLEY, Esq.
9. *History* } of England . . . { REV. HENRY WACE, B.A.
10. *Geography* } . . . { WILLIAM HUGHES, Esq. F.R.G.S.
11. *Arithmetic and Book-keeping* . . . JAMES HADDON, Esq. M.A.
12. *Mathematics* { Rev. T. A. COCK, M.A.
Rev. W. HOWSE, M.A.
T. S. CARTE, Esq. M.A.
13. *Principles of Commerce* . . . Professor LEONE LEVI.
14. *Drawing* Professor DE LA MOTTE.
15. *The Elements of Chemistry* . . Professor C. L. BLOXAM.
16. *Mechanics* G. R. SMALLEY, Esq. B.A.
17. *Physiology* Professor BEALE, M.B.
18. *Botany* Professor BENTLEY, F.L.S.
19. *Experimental Physics* . . . Professor MAXWELL, M.A.
20. *Spanish* Don B. B. AGUIRRE, B.A.
21. *Dutch* Dr. KÖSTER.
22. *Zoology* Professor RYMER JONES, F.R.S.

12. THE FOLLOWING WILL PROBABLY BE THE COURSE FOR THE SUMMER SESSION, 1862:—

Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
Chemistry. Greek. German. Botany.	Mathematics. Italian. Spanish.	English. The Microscope.	Nat. Philosophy. French. Arithmetic. Zoology.	Latin.

The Hour of Meeting will be 6.30 p.m.; each Class will last one hour and a half.

The Fee for each separate subject will be 1*l.* 1*s.*; for Four Classes, 3*l.* 10*s.*; for Five Classes, 4*l.* 4*s.*

13. PRIZES AND CERTIFICATES.

1. At the close of each Winter Session, examinations are held in each subject; Prizes, and Certificates of Honour and Merit are then given.

2. A Prize will be given to each of the first 5 Students who gain the highest aggregate number of Marks in all the subjects, (not exceeding 5 in number, of which Divinity must be one), which they respectively bring up for examination at the end of the Winter Session; provided only that no prize will be given for a less aggregate than 300 marks.

3. In each Class for which not less than 10 Students have entered, there will be offered :—

a. A Prize (or Certificate of Honour at his option) to the Student who shall be highest in the examination.

b. Certificates of Merit (One Certificate to each of the Students next in succession who shall gain not less than three-fifths of the marks allotted to the subject).

4. Whenever a Class is divided into two or more divisions, each division will be treated as a distinct Class, as regards Prizes and Certificates.

5. There is also an examination on each subject at the close of each Summer Session, and Certificates of Merit are then given to all who obtain three-fifths of the whole number of marks.

6. The Prizes and Certificates are open to ALL Students of the Evening Classes.

7. No Prize or Certificate can be awarded, unless earned by—

a. Regular and punctual attendance. *b.* Good conduct. *c.* Absolute merit in the examination.

8. The highest number of marks assigned to each subject is 100. The standard for “absolute merit,” which alone will carry a Prize or Certificate of Honour, will be 75. The standard for “Certificates of Merit” is 60.

9. Certificates of having obtained a College Prize, made out under the signatures of the Principal and Secretary, may be obtained by application at the College Office.

Fee 2*s.* 6*d.* for each Certificate.

14. SCHOLARSHIPS AND PRIZES OPEN TO ALL MATRICULATED STUDENTS OF THE COLLEGE.

For the conditions on which such Scholarships and Prizes are open to Matriculated Students of the Evening Classes, see the King's College Calendar.

15. THE ASSOCIATESHIP OF KING'S COLLEGE, LONDON.

Rules under which this rank is granted to Students of this Department.

A. REGULAR AND PUNCTUAL ATTENDANCE on twelve Courses of Lectures, in addition to three Winter Courses of Divinity.

1. The twelve Courses may be taken in any number of subjects taught in the Evening Classes of King's College, being not less than two.

2. A Student must attend at least two Courses in each Winter Session.

3. The attendance must extend over a period embracing at least three Winter Sessions, except in the case of Students entering after Christmas, who may reckon their *time* from the beginning of the Winter Session.

4. Credit will not be given for an attendance on more than four Classes, exclusive of Divinity, in any one Session.

5. The Matriculation Fees (£3 11s.) must be paid at the commencement of the first Winter Session.
6. In the case of Students who begin their attendance after Christmas, an attendance on two Courses during the remaining half Session will be held to be equivalent to one Course during the whole Winter Session.
7. The foregoing regulations apply to Courses of Lectures held during the Winter Session; but an attendance on two courses during a Summer Session will be reckoned for one Winter Course.

B. Good conduct throughout the time occupied by the Student's attendance.

C. Attendance at the College Chapel on Sunday Morning during the time that the Student is attending the Evening Classes, unless specially exempted by the Principal.

D. Gaining during the course of time occupied in attendance either

- (1.) A Prize;
- or (2.) A Certificate of Honour;
- or (3.) Two Certificates of Merit. This rule applies to Certificates gained in the Winter Session; but two Certificates gained in a Summer Session will be allowed for one Winter Certificate.

E. Gaining at least half marks in an examination to be held at the time of applying for the Associateship.

(1.) In Divinity.

(2.) In any other three of the subjects taught in the Evening Classes of King's College; these to be selected by the Candidate himself.

F. For the privileges of an Associate, see the King's College Calendar.

G. Students intending, at any future time, to apply for the Associateship, must take out at the close of their first Session a Schedule, on which the fact of their attendance in each class will be recorded. See Calendar.

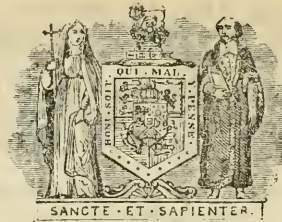
16. Further information may be obtained, and Fees paid, at the Secretary's Office, from 10 to 4 daily; also in the Library of the College, after the commencement of Lectures, from 6 to 8 P.M. on Monday, Tuesday, Thursday, and Friday.

17. The Principal, as a general rule, will be ready, after the commencement of the Course, to receive Students for the purpose of registering them upon the College Books, at 6.45 on Tuesday and Thursday evenings.

A detailed Syllabus of the Lectures given during the Winter Session will be found in the College Calendar, price 2s. 6d., or 3s. per post; OR IT MAY BE OBTAINED IN A SEPARATE FORM, PRICE TWOPENCE, or Threepence per post. Apply to J. W. CUNNINGHAM, Esq. King's College, London.

N.B.—The next day fixed for the admission of new Pupils, in 1861, is Tuesday, September 24.

KING'S



COLLEGE,

LONDON.

The School.

Head Master.—REV. J. R. MAJOR, D.D.

Vice-Master.—REV. J. FEARNLEY, M.A.

Assistant Masters.

T. S. CARR, Esq. M.A.
Rev. T. O. COCKAYNE, M.A.
Rev. W. HAYES, M.A.
Rev. GEORGE RUST, M.A.
Rev. C. U. DASENT, M.A.

Rev. OTTO ADOLPHUS, M.A.
T. S. CARTE, Esq. M.A.
Rev. J. H. STANDEN, M.A.
Rev. J. D. KINGDON, M.A.
Rev. G. F. MACLEAR, M.A.

Mathematical Master.—GEORGE ROBERTS SMALLEY, Esq. B.A.

Arithmetical and Second Mathematical Master.—J. HADDON, Esq. M.A.

Writing and Second Arithmetical Master.—J. W. LE JEUNE, Esq.

Assistant Writing and Arithmetical Master.—G. E. MORPHETT, Esq.

French Language.—M. THIBAUDIN, Master, and M. WATTEZ and M. ISNARD, Assistant Masters.

German Language.—Rev. A. WINTZER, Ph. D. Master.

Geometrical Drawing.—T. BRADLEY, Esq. Professor.

Landscape Drawing.—P. H. DE LA MOTTE, Esq. Professor.

Lecturer on Science.—CHARLES TOMLINSON, Esq.

King's College School consists of two divisions:—

A. The "Division of Classics, Mathematics, and General Literature."

B. The "Division of Modern Instruction."

A.

Division of Classics, Mathematics, and General Literature.

1. This division is intended to prepare Pupils for the Universities, for the Theological, General Literature, and Medical Departments in the College, and for the learned professions.

2. The regular course of Instruction comprises Divinity; the Greek, Latin, English, and French Languages; Mathematics, Arithmetic, Writing; History, and Geography. Hebrew is also taught to the Upper Sixth Class.

3. German is taught, without any additional charge, to Pupils of the sixth, fifth, and fourth Classes, after the regular School hours, on Wednesday, from $\frac{1}{2}$ -past 1 to 3, and on Saturday, from 12 to $\frac{1}{2}$ -past 1. Pupils of the lower Classes may learn this Language on payment of 10s. 6d. per term.

4. Instruction in Drawing may also be obtained by all pupils on Tuesday and Friday, after the regular School hours, on payment of 14s. a term, including drawing materials.

5. **SCHOLARSHIPS.**—Two of 30*l.* (one in Classics and one in Mathematics) for three years: four of 20*l.* (one for each division, and two in Mathematics); two of 15*l.*; two of 10*l.*; two of 8*l.*; and two of 6*l.*; are annually given, in the Lent Term, to those Pupils who shall pass the best examinations.

Division of Modern Instruction.

1. This Division is placed under the general direction of the Rev. John Fearnley, M.A., Vice-Master of King's College School, assisted by the Rev. J. H. Standen, M.A., T. S. Carr, Esq. M.A., and by the Mathematical, Arithmetical, French, German, and Drawing Masters.

2. The object in view in this Division is to prepare Pupils for general and mercantile pursuits, for the Departments of Engineering, Architecture, and Military Science in the College, for the Military Academies at Woolwich, Sandhurst, and Addiscombe, and for the Royal Navy and the Commercial Marine.

3. Pupils in this Division take corresponding rank with those in the Division of "Classics, Mathematics, and General Literature."

4. The Mathematical Scholarships, of 30*l.* and 20*l.*, are open to pupils in this Division.

5. The regular course of Education in this Division commences with the Lower First Class.

6. In addition to the regular course of Instruction in the Modern Languages, it has been thought advisable to introduce French and German Conversational Classes, with the view of imparting to the Pupil, by the daily habit of conversation, a facility for expressing himself in these languages, and thereby superseding as far as possible the necessity of a residence upon the continent.

7. Separate Classes are also formed, so as to give special extra Instruction, gratuitously, to boys preparing for any of the following; viz.—

1. Commercial pursuits.
2. Military and Naval studies.
3. Engineering and Architecture.

General Rules and Regulations,

Applicable to the whole School.

1. All boys above the Second Class, (the First and Second Classes being common to both Divisions,) will be placed in whichever Division their parents or guardians shall select. Pupils may at any time be moved from one Division to the other.

2. The general age of admission is from nine to sixteen years.

3. The duties of each day commence with Prayers and the reading of the Scriptures in the College Chapel, from which none of the Pupils are allowed to absent themselves.

4. The periods for the admission of Pupils are, the middle of January; the beginning of May; and the middle of September.

Before entering a pupil, the Head Master must be furnished with a *testimonial of good conduct from the applicant's last instructor*, as well as such particulars with respect to his previous studies as may lead to a correct classification.

5. The Hours of attendance are :—

On Monday, Tuesday, Thursday, and Friday, from..... 9 o'Clock to 3.

On Wednesday, from 9 o'Clock to 1.

On Saturday, from 9 o'Clock to 12.

Pupils who are irregular in their attendance, or inattentive to their studies, will be detained one hour longer, under the charge of a Master; and in each case a letter will be sent to the parent or guardian, stating the cause of the detention.

6. The Vacations consist of seven weeks in Summer; one month at Christmas; and five days at Easter. Pupils are expected to attend the School till the Vacations commence, and to return punctually when they close.

7. There is annually, previous to the Summer Vacation, a public distribution of Prizes awarded by the Council. Examinations for places in the Classes, for promotion, and for Prizes, take place each Term.

8. A Register is kept by the Head Master and the other Masters, of the attendance, employments, and general conduct of the pupils; of which periodical reports are transmitted to their friends.

9. Instruction may also be obtained within the College, in Italian, Chinese, Hindustani, Fencing, Singing, and Dancing.

10. A course of eight elementary Lectures is given each term to each Division, on some subject connected with Art or Science.

11. The terms for the whole regular course of Instruction, in either Division, including *Stationery and the use of Books*, are 7*l.* 15*s.* 2*d.* per Term. There are three Terms in each year.

12. Upon entrance, the Fees for the first two Terms must be paid in advance, together with the sum of 2*l.* 3*s.* 6*d.* for Entrance Fees, for the use of a Box, and for the College Calendar; amounting altogether to 17*l.* 13*s.* 10*d.* All fees are payable in advance.

13. Upon entering the Sixth Class, each Pupil is called upon to contribute Ten Shillings to the School Library.

14. *Books*.—The Council having resolved to establish the system of Loan with regard to books, no Boys will be permitted, except those in the Upper Sixth Class, or under unusual circumstances, to bring their own books to the School.

15. A sufficient time, at 1 o'clock each day, is allowed for luncheon, which is provided in the College at a regulated expense.

Those parents who may wish their sons to dine at this hour, may avail themselves of an arrangement made for this purpose in the College Hall. One of the Masters always presides. The expense of dinner is—

£4 5*s.* per Term, for six days in the week.

£3 0*s.* „ for the Monday, Tuesday, Thursday, and Friday in each week.

0 1*s.* 3*d.* per diem for a single dinner.

N.B. It is earnestly requested that parents will, as far as possible, adopt the system of taking out tickets for four or six days, as the case may be, at the beginning of each term, instead of allowing their sons to make daily payments.

16. Pupils who have been in the School two years, and before leaving it have reached the Upper Sixth Class, are entitled to be recommended for election as Associates of King's College, London, after two years' study in the General Literature, Applied Sciences, or Military Departments of the College, instead of after three years as in all other cases.

17. Pupils may reside with their parents or friends. The following Masters receive Boarders on terms sanctioned by the Council, which may be learnt on application to them, or at the Office of the College:—

Rev. J. R. MAJOR, D.D. 42, Bloomsbury Square.

Rev. T. O. COCKAYNE, M.A. 17, Montague Street, Russell Square.

Rev. GEORGE RUST, M.A. 31, Bedford Square.

Rev. C. U. DASENT, M.A. 14, Spencer Road, Putney, S.W.

Rev. O. ADOLPHUS, M.A. Palace Square, Sydenham.

18. EXTRA INSTRUCTION,

After the regular School hours, may be obtained in the following subjects:—

		Per Term.			Per Ann.	
		£	s.	d.	£	s.
German.....	Rev. A. Wintzer, Ph.D. }	See page 28.				
Drawing	Prof. De La Motte.....					
Fencing	Professor H. C. Angelo	1	11	6	4	4
Drilling	ditto	0	10	6		
Dancing	Edmund Goodwin, Esq.	1	11	6	4	4
Singing	Professor Hullah.....	1	1	0		
Workshop	G. A. Timme, Esq. ...	1	1	0		
Photography	Thomas Sutton, Esq. B.A.	See page 11.				

N.B. NO PUPIL CAN BE ADMITTED TO ANY OF THESE CLASSES WITHOUT PRODUCING THE COLLEGE TICKET, SIGNED BY THE SECRETARY.

EXTRACT *from the* CHARTER of KING'S COLLEGE, LONDON.

"THAT the Council shall have power to accept, on behalf of the said College, gifts and endowments for promoting particular objects of education, or otherwise, in aid of the general purposes of the College, on such terms and conditions as may be agreed on, for the purpose, between the Council and the person bestowing such gifts or endowments."

N.B. The Council will be very glad to receive, under the foregoing clause of their Charter, any sum that may be offered to them for the endowment, in whole or in part, of any particular Scholarship or Professorship.

FORM OF BEQUEST TO KING'S COLLEGE, LONDON.

"I give to the Corporation of the 'Governors and Proprietors of King's College, London,' the Sum of Pounds, (for the general purposes of the said Corporation, or for the foundation of Scholarships and Prizes, open to the whole College, or limited to any particular Department,) to be paid exclusively out of such part of my Personal Estate as I can lawfully charge therewith; and I desire that the said Sum of Pounds be paid, free of all deductions, be the Treasurer for the time being of the said Corporation, whose receipt shall be a full and sufficient discharge for the same."

N.B. Information may be obtained from the Principal or the Secretary as to the particular Endowments most needed by the College, and as to the best regulations to be enacted for securing the objects of the Donor.

INDEX TO THE PAGES IN WHICH INFORMATION AS TO SEPARATE CLASSES WILL BE FOUND.

	PAGE		PAGE
Anatomy	15, 16	Greek	8, 23
Anglo Saxon	23	Hebrew	3
Arabic	8	History	8, 23
Arithmetic, and Book-keeping	23	Hospital Hours, Fees, &c.	17
Arts of Construction	10, 13	Italian	8, 23
Botany	15, 16, 23	Latin	8, 23
Chemistry	9, 15, 16, 23	Manufacturing Art	10, 13
„ (Analytical)	10, 15	Materia Medica	15, 16
„ (Practical)	10, 15	Mathematics	8, 9, 23
Chinese	8	Mechanics	23
Classical Literature	8	Medical Tutor	15
Commerce	23	Medicine	15, 16
Comparative Anatomy	15, 16	Midwifery	15, 16
Council, Members of	2	Mineralogy	11, 13
Dancing	29	Modern History	8, 23
Drawing (Geometrical)	11, 13	Modern Greek	8
„ (Landscape)	8, 11, 23, 23	Natural Philosophy	9, 13, 23
Drilling	28	Pastoral Theology	3
Dutch	23	Photography	11
Ecclesiastical History	3	Physiology	15, 16, 23
English Language, Literature, and		Political Economy	23
Composition	8, 23	Public Health	3
Exegesis of the New Testament	3	Public Reading	3
Exegesis of the Old Testament	3	Sanscrit, &c.	8
Experimental Physics	23	Spanish	23
Fencing	8, 29	Surgery	15, 16
Forensic Medicine	15, 16	Surveying	11, 13
Fortification	14	Turkish	8
French	8, 23	Vocal Music	3
Geography	23	Warneford Scholarships	19
Geology	10, 13	Workshop	12
German	8, 23, 28	Zoology	23

NOTICE.

ENLARGEMENT OF THE ARCHIVES.

Four Numbers are now published in the year, at the price of 2s. 6d. each.

One volume will be published annually, consisting of four numbers, bound in Cloth, price 11s. **EACH VOLUME IS COMPLETE IN ITSELF.**

The number of pages and illustrations in the Journal will be increased in proportion to the number of subscribers.

VOL. II., price 15s., cloth 8vo., with several **Wood Cuts**, and **16 Plates**, is now ready. Nos. 5, 6, 7, & 8, may still be obtained at the published price, 3s. 6d. each.

All Subscribers to this Journal are requested to forward their names to the Editor.

TO AUTHORS AND CONTRIBUTORS.

IN Number VI a short analysis of the Contents of the different Works sent to the Editor was given. It is proposed to continue this system. The few remarks offered will be purely *analytical*. *Critical* notices are inadmissible. If the authors of original papers and essays will transmit to the Editor a brief and simple summary of the results to which they have arrived, with their printed communication, this department of the Journal will be rendered more complete. Pamphlets and short papers, English and Foreign, on subjects connected with medicine and surgery, which are not generally noticed in reviews, will be included in the summary.

Copies will be forwarded on the morning of publication, post free, to gentlemen who send their addresses, accompanied with a remittance for their subscription, addressed to the Editor, King's College, London.

Contents of No. IX.

	Page
Part I. Clinical Observations.	
On an important case of muscular atrophy, accompanied with disease of the spinal cord—Microscopic examination of the diseased structure, with comments, by Mr. Lockhart Clarke—Clinical observations, by Dr. Gairdner—A narrative of the history of the patient, by Drs. Adamson and Bell—With notes, by Drs. Gull and Day. Plate I.	1
Clinical remarks on the exfoliation of mucous membrane from the womb and vagina, during menstrual periods, by Dr. Tilt. Plate II.	26
A case of acute waxy degeneration of the liver and kidneys, by Dr. Sieveking	33
Case of rupture of the heart, consequent upon wasting and softening of the muscular tissue, by Dr. Arlidge	39
Sequel of a case of acute pericarditis, with effusion, not occurring in connection with rheumatism—Notes by Mr. Harrison; the post-mortem by Mr. C. J. Workman	43
Suggestions for taking cases and making post-mortem examinations, by Dr. Beale	47
Part II. Original Researches in Physiology and Morbid Anatomy.	
On the histology of a recurring fibroid tumour, by Dr. Roberts, Plate III.	66
On the structure and growth of the tissues—A course of lectures delivered at the Royal College of Physicians—Lecture VI. Plates IV, V, Dr. Beale	71
Explanation of the Plates	

CONTENTS OF THE LAST NUMBER. No. VIII.

Lectures on the Structure and Growth of the Tissues, delivered at the Royal College of Physicians by Dr. Beale; Lectures I to V.—On the Microscopical Characters of the Secretions from Infecting and Non-Infecting Sores, by Mr. Lee—Urine from a Case of long-continued Sweating, by Dr. Gibb—Diseased Pancreas, by Mr. Hooper—Urine and Kidney from a Case of Suppurative Nephritis, by Mr. Newham—Portion of Kidney passed by the Urethra—Very Minute Sarcinae—On a Clinical Microscope, by Dr. Beale—On the Reduction of Microscopical Measurements to a Common and Convertible Standard, by Dr. Geo. Lawson—Index—Title—Four Plates—List of Gentlemen holding Office in the Medical Department of King's College and King's College Hospital; and Students who have obtained honours, passed examination, or gained appointments.

No. X (2s. 6d.), forming the second Number of Vol. III, will be published on Jan. 1st, 1862; and in future four numbers will be published in the year.

All communications to be addressed to the Editor, King's College, Strand, London, W.C.